

**2007 Farm Bill:  
Policy Options and Consequences for Northeast  
Specialty Crops Industries, Small Farms, and  
Sustainability Programs**

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## TABLE OF CONTENTS

	<u>Page</u>
List of Tables .....	iii
List of Figures .....	v
Executive Summary .....	vii
CHAPTER ONE: Report on Listening Sessions .....	1
Specialty Crop Production in the Northeast.....	2
Specialty Crop Policy Issues.....	7
Summary of Farm Bill Preferences.....	7
Implications and Conclusions for Policy Options .....	11
CHAPTER TWO: Farm Savings Accounts for Specialty Crop Growers.....	14
Introduction – Farm Savings Accounts.....	14
Data Used in the Analysis of FARRM and CC Accounts .....	15
FARRM Accounts .....	16
<i>FARRM Accounts: Eligibility, Deposits, and Participation Incentives</i> .....	17
Eligibility .....	17
Deposits to FARRM Accounts .....	18
Participation Incentives for FARRM Accounts .....	19
<i>FARRM Accounts: Withdrawals and Benefits</i> .....	23
Withdrawals and Benefits of Tax Deferral .....	26
<i>FARRM Accounts: Income Shortfalls and Stabilization</i> .....	29
Counter Cyclical Savings Accounts.....	33
<i>CC Accounts: Analysis of Gross Income Variability</i> .....	33
<i>CC Accounts: Eligibility and Participation Incentives</i> .....	33
Deposits to CC Accounts .....	35
Participation Incentives.....	35



<i>CC Accounts: Withdrawals and Benefits</i> .....	36
Results of Withdrawals and Benefits.....	37
CC Accounts: Income Shortfalls and Stabilization .....	39
Conclusions.....	43
CHAPTER THREE: Metropolitan Growth and the Specialty Crops Industries in the United States: Farming in the City’s Shadow.....	48
Introduction.....	48
Methods and Data .....	50
<i>Measuring Urban Settlement</i> .....	50
Identifying Metro Counties for Study.....	51
<i>A Working Definition of Specialty Crops</i> .....	52
Results .....	54
<i>National Overview: Agriculture and Urbanization</i> .....	54
<i>Specialty Crop Production in Metropolitan Areas</i> .....	56
<i>Specialty Crop Production in the Metropolitan Areas by Region</i> .....	56
<i>A Closer Look at the Northeast: Position of Metro Agriculture</i> .....	62
<i>A Closer Look at the Northeast: Changes in Farm Commodity Production</i> .....	67
Summary and Discussion.....	76
REFERENCES .....	79
Appendix A – Mail Questionnaire.....	81
Appendix B – Listening Session Notes W.I. (Myers Advisory Council).....	85
Appendix C – Listening Session Notes with Northeast representatives of the National Association of State Departments of Agriculture .....	88
Appendix D - Summary of Main Points Made by Panelists at the New York Crop Insurance Workshop .....	92
Appendix E – Listening Session Notes with New York Farm Bureau.....	97

## LIST OF TABLES

<u>Table No.</u>	<u>Page</u>
1	Summary of Listening Sessions .....2
2	Descriptive Statistics of Net Income by Year, 32 Grape Farms in Lake Erie Region .....17
3	Percent of Farms with Net Income Enabling them to Contribute to FARRM Accounts, 30 Grape Farms in Lake Erie Region, 2000-2004 .....18
4	Percent of Farms with Income Enabling them to Contribute to FARRM Accounts and Deposit Summary of FARRM Accounts per Year, 30 Grape Farms in Lake Erie Region.....19
5	The Marginal Tax Brackets of Taxable Income .....20
6	Percent of Farms in Various Tax Brackets Assuming Taxable Net Income with / without Deductions and with / without Maximum Contribution to FARRM Accounts, 30 Grape Farms, 2000-2004 .....21
7	Percent of Farms Changing Income Tax Brackets as a Result of a Contribution to FARRM Accounts, by Year, 30 Grape Farms in Lake Erie Region .....22
8	Number of Years that Farms Switched Income Tax Brackets as a Result of Contributions to FAARM Accounts, 30 Grape Farms in Lake Erie Region, 2000-2004 .....23
9	Percent of Farms Qualifying to Make Withdrawals from FARRM Accounts Under Various Income Targets, 30 Grape Farms in Lake Erie Region .....26
10	Percent of Farms Having the Need to Withdraw Funds from FAARM Accounts 30 Grape Farms in Lake Erie Region, 2000-2004 .....27
11	Average Withdrawals from FARRM Accounts, 30 Grape Farms in Lake Erie Region.....27
12	Summary of Annual and Cumulative Tax Deferral Benefits from FAARM Accounts, 30 Grape Farms in Lake Erie Region.....28
13	Summary of Final Balances in FARRM Accounts, 30 Grape Farms in Lake Erie Region..28
14	Percent of Farms Experiencing Shortfall, 30 Grape Farms in Lake Erie Region.....29
15	Average Annual Shortfall, 30 Grape Farms in Lake Erie Region .....30
16	Summary of the Shortfall with and without FARRM Accounts, 30 Grape Farms in Lake Erie Region .....31 & 32
17	Descriptive Statistics for Schedule F Gross Income by Year, 32 Grape Farms in Lake Erie Region .....33
18	Percent of Farms with Gross Income Enabling them to Contribute to CC Accounts, 27 Grape Farms in Lake Erie Region, 2000-2004 .....34
19	Percent of Farms Eligible to Contribute to CC Accounts and Deposit Summary of CC Accounts per Year, 27 Grape Farms in Lake Erie Region .....34

<u>Table No.</u>		<u>Page</u>
20	Percent of Farms Eligible to Withdraw Funds from CC Accounts, 27 Grape Farms in Lake Erie Region.....	37
21	Number of Times that Farms are Eligible to Withdraw Funds from CC Accounts, 27 Grape Farms in Lake Erie Region, 2000-2004.....	38
22	Average Withdrawals from CC Accounts, 27 Grape Farms in Lake Erie Region .....	38
23	Summary of Final Balances in CC Accounts, 27 Grape Farms in Lake Erie Region .....	39
24	Percent of Farms Experiencing Shortfall, 27 Grape Farms in Lake Erie Region.....	40
25	Average Annual Shortfall, 27 Grape Farms in Lake Erie Region .....	40
26	Summary of the Shortfall with and without CC Accounts, 27 Grape Farms in Lake Erie Region .....	41 & 42
27	Number of Counties, Land Area and Population of Metropolitan Statistical Areas (MSA), 1950-2005 .....	54
28	Land in Farms and Use of Farmland by Metro Status, 2002.....	55
29	Distribution of Farms by Farm Size and Metro Status, 2002 .....	55
30	Value of Agriculture Products Sold by Metro Status in the U.S., 2002 .....	57
31	Vegetables Sold by Metro Status, 10 Regions, 2002.....	59
32	Fruit Sold by Metro Status, 10 Regions, 2002.....	60
33	Nursery and Greenhouse Products Sold by Metro Status, 10 Regions, 2002.....	61
34	Population by State and Metropolitan Status, Northeast, 2005 .....	63
35	Farms by Industrial Classification (NAICS), 12 Northeast States, 2002 .....	64
36	Value of Agricultural Products Sold by Metro Status, 12 Northeast States, 2002 .....	66
37	Crop and Livestock Sales by Commodity Group, 12 Northeast States, 2002 .....	70
38	Change in Crop and Livestock Sales by Commodity Group, 12 Northeast States, 2002.....	71

## LIST OF FIGURES

<u>Figure No.</u>	<u>Page</u>
1 Farms and Land in Farms, Northeastern US, 2002 .....	3
2 Market value of farm products sold, Northeastern US, 2002 .....	3
3 Farms classified by principal enterprise, 12 Northeast states, 2002 .....	4
4 Farms classified by principal enterprise and dollar amount of farm products sold/government payments, 12 Northeast states, 2002 .....	5
5 Specialty crops with a national rank of 10 or higher, 12 Northeast states, 2002 .....	6
6 If you agree that Federal support for specialty crops is warranted... ..	9
7 The 2007 Farm Bill may need to reduce or reallocate federal funding for current farm programs.....	9
8 The 2007 Farm Bill may support new programs with new or reallocated Federal funding.....	10
9 If federal funding for risk management programs is increased which approach... ..	10
10 Considering the following environmental goals, should federal conservation programs be modified to increase benefits for landowners in NE states? .....	12
11 Key definitions for rural and urban in federal statistics.....	51
12 Changes in Nonmetropolitan and Metropolitan Status, 1980-2003.....	52
13 Vegetables Sold by Metro Status, 2002.....	59
14 Fruit Sold by Metro Status, 2002.....	60
15 Nursery and Greenhouse Products Sold by Metro Status, 2002.....	61
16 Changes in Nonmetropolitan and Metropolitan Status in the Northeast U.S., 1980-2003 .....	64
17 Vegetables, Melons, Potatoes, and Sweet Potatoes as Percent of Total Market Value of Agriculture Products Sold, Northeast, 2002 .....	65
18 Fruit, Tree Nuts, and Berries as Percent of Total Market Value of Agriculture Products Sold: 2002.....	68
19 Nursery and Greenhouse Product Sales as Percent of Total Market Value of Agriculture Products Sold: 2002.....	68

20	Growth in market value of farm products sold, selected commodity sectors, US and 12 Northeast states, 1982-1992 and 1992-2002 .....	72
21	Fruit sales, average for 182 counties 12 Northeast States, 1982-2002 .....	75
22	Nursery and Greenhouse Product Sales, average for 217 counties in 12 Northeast States, 1982-2002 .....	75

## **Executive Summary**

In phase I of the Specialty Crops project, we solicited information and feedback on specialty crop industry members' views and preferences with respect to the upcoming 2007 Farm Bill. Several aspects of Federal support for specialty crop producers are considered. This information was used to gauge responsiveness to a wide set of policy options and possible directions for titles that might be incorporated into the next farm bill. The geographic focus of this report encompasses the Northeastern US, defined here to include 12 states—Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and West Virginia.

Four listening sessions were organized, and a mail survey was administered that focused on the views and opinions of representatives from specialty crop organizations across the Northeast region. (Our definition of specialty crops included the following categories: fruit, vegetables, floriculture, nursery, turf, maple syrup, Christmas trees, aquaculture, honey, and mushrooms.)

We complemented these activities with contacts with individual growers, extension educators, members of the agribusiness community, and state agricultural officials. In many cases, these individuals indicated that they completed the questionnaire after canvassing the views and opinions of their membership. We received survey responses from 37 organizations, nearly 50% of the organizations contacted. Major findings are as follows:

- Specialty Crops interests were not generally in favor of traditional program crop instruments (e.g. price supports, regulated prices, loan rates, deficiency payments, countercyclical payments, etc.).
- Specialty Crops interests were in favor of subsidized revenue insurance policies (e.g. AGR and AGR-Lite) or alternatives such as subsidized counter cyclical, tax deferred savings accounts.
- There were mixed results regarding disaster assistance. Some Specialty Crops interests saw the need for a continuation of disaster assistance. Others maintained that disaster assistance was ad hoc, making it difficult for producers to make rational business planning decisions about risk management.
- There was generally strong support for conservation type programs that are better tailored for Specialty Crops resource situations.

### **Farm Savings Accounts for Specialty Crop Growers**

A study was conducted to examine the potential benefits of establishing government subsidized farm savings accounts for specialty crop growers. The primary goal of this component of the project was to determine whether farm savings accounts would provide specialty crop growers with a useful tool for managing financial risk. The project examined how various features of the farm savings account proposals ultimately impacted the benefits that specialty crop growers would receive from the accounts.

Two specific types of farm savings accounts, counter-cyclical farm savings (CC) accounts and farm and ranch risk management (FARRM) accounts, were evaluated. Both accounts require that the farmer deposit funds into the account. The analysis evaluated the eligibility of specialty crop growers to contribute and withdraw funds from CC and FARRM accounts, as well as how the use of the accounts would impact farm income variability.

Under the counter-cyclical savings accounts program, eligibility is based upon gross income, the government would match the farmer's deposit up to \$5,000, and farmers could withdraw when gross income fell below a specified trigger level. For FARRM accounts, eligibility to participate was based upon positive net income from farming and deposits were not matched, but rather were tax deferred. Withdrawals from the accounts were evaluated using various historical gross income trigger levels.

The study produced a number of findings that illustrate some of the potential benefits and challenges of developing a farm savings account program for specialty crop growers. Within the sample of farmers considered (juice grape growers in western New York and western Pennsylvania), the positive net income contribution requirement for FARRM accounts was more restrictive than the \$50,000 gross income requirement for CC accounts. Additionally, because the benefits of the FARRM account are based on tax deferral, fewer farms would have incentives to participate as opposed to CC accounts. Based on farm income alone, nearly half of the farms in the study were in the 10% or lower marginal federal income tax bracket. Similarly, larger and more profitable farms would receive the greatest benefits from the FARRM account program.

On average, the size of farmer deposits to both types of accounts were similar, but when the government match is considered, the average CC account balance was larger than the average FARRM account balance. The ability of farms to make withdrawals from the account is very dependent upon the nature of the withdrawal provisions. For instance, if withdrawal triggers are not indexed to allow for growth, few farms will be able to make withdrawals. Restrictive withdrawal rules will significantly reduce the appeal of the accounts as a risk management tool.

The accounts showed promise in their ability to reduce income variability. However, restrictions on the size of deposits will limit the accounts' ability to completely mitigate income variability. Many farms will still experience considerable income variability. The accounts also appear unable to handle yearly back-to-back adverse financial outcomes. Unless larger subsidies are offered, savings account programs are unlikely to provide a complete risk management solution for specialty crop growers. Additionally, for widest appeal the program should combine both government deposit matching and tax deferral of deposits.

## **Metropolitan Growth and the Specialty Crops Industries in the United States: Farming in the City's Shadow**

Agriculture is an integral part of urban growth and population change. This fact is frequently unrecognized by the general public, mainstream agricultural interests, and political leaders. In many people's minds, there is the perception of a rural – urban split that results in competition for resources and separate policies. A critical need exists to gain a better understanding for our current

agricultural situation and to broaden the perception of agriculture beyond its traditional rural roots and commodity production focus. Today, agriculture is found in both rural and urban locations, but in differing forms and intensities. In seeking better understanding of high-value agricultural production in metropolitan areas, this phase of our research assessed distribution of the specialty crops production in the urbanizing areas in the U.S. in order to answer the questions such as “Does specialty crops production still thrive in the metro areas?” or “Does farming persist in the city’s shadow?”

Our review of Census data shows that, when farms are classified by predominant enterprise, 56% of vegetable and melon farms, 73% of fruit and tree nut farms, and 66% of greenhouse, nursery and floriculture production farms in the U.S. are located in metro counties. Overall, metro counties account for 24% of the nation’s farmland acreage but 41% of all farms are located there. Moreover, direct sales to consumers (65%) and organic production sales (50%) are also mainly by metro farms. These agriculture sectors tend to produce higher sales per acre than other agriculture enterprises. A majority of specialty crop production sales were conducted by metro farms, including 66% of vegetable sales, 83% of fruit sales, and 75% of nursery and greenhouse product sales in 2002.

Many nonmetro counties in some regions are also heavily vested in specialty crop production. In the Northeast, Southeast, Mountain, and Pacific regions, metro areas produce more sales than nonmetro areas. In the Lake, Appalachian, and Delta regions, nonmetro counties produce more vegetable sales. With respect to fruit production, the top five States are California (63.3 % of U.S total), Florida, Washington, Oregon, and Michigan. Fruit production in the country is concentrated in the Pacific region, accounting for 75 % of the U.S total.

With respect to nursery/greenhouse production, the top five production states are California, Florida, Oregon, Pennsylvania, and Texas. The distribution of sales of nursery/greenhouse production seems to be homogeneously concentrated in the metro counties across regions. Location plays the important role for nursery/ greenhouse crop production. Except for the Southern Plains states, where the Census publishes insufficient data and county level, our analysis showed that metropolitan counties produce more nursery/ greenhouse sales than nonmetro counties across all regions.

This study was motivated by the economic circumstances confronting commodity agriculture in the Northeast. This region is the nation's oldest and most densely settled. The 12 Northeast states take up 7% of the land in the 48 contiguous states but account for 21% of the nation's 2005 population (62.3 million); just under 90% of this total population is classified as metropolitan.

According to the 2002 Census of Agriculture, the Northeast has nearly 169,000 farms. Considering the predominant enterprise on these farms, the Census classifies about 29,500 of this total into the specialty crop category. Considering all farms, 56% are situated in Metro counties, but this fraction goes to 69, 60, and 71%, respectively, for farms classified as vegetable, fruit, nursery/greenhouse operations.

When all crops sales are considered, metropolitan counties account for nearly 75% of total sales in the Northeast. Vegetables, along with potatoes, are not overrepresented in metropolitan counties



compared to all crops. Nearly two thirds of total fruit sales are situated in metropolitan counties. A wide variety of commodities falls in the fruit category for the Northeast. A predominant category includes numerous tree fruits, but berry and vine crops are important as well, along with such specialties as cranberries and vinifera grapes. About 18% of total farm sales in the Northeast trace to the production of nursery, greenhouse, floriculture, and sod crops; metropolitan counties account for the overriding share of these commodity sales. According to the 2002 Census of Agriculture, nearly 85% of all revenue generated in the green industries is attributable to operations located in northeast counties presently classified as metropolitan.

All Northeast states registered appreciable increases in sales of vegetables and nursery/greenhouse products over the time span considered. Values for changes on 10-year interval are erratic on percentage basis and often reflect sales movements from a relatively small base. Sales of fruit commodities are clearly on a different trajectory in the Northeast compared to other specialty crop categories. Fruit sales reported for 2002 topped \$525 million but this amount is nearly 7% less than the nominal value reported in the 1992 Census. Important differences occur between states, though. In the Northeast, Maryland, New Jersey registered significant increases over this 10-year period.

Nursery/greenhouse products account for nearly a fifth of total farm commodity sales in the region, and sale increases were registered across the board for these green industries between 1992 and 2002 and for the earlier 1982-1992 interval as well. The overall increase in sales in the 12 state region during the 1990s amounted to 65%; the corresponding percentage change during the 1980s was 89%.

Overall, it was clear from our analysis that specialty crops production does continue to thrive in metropolitan areas, in both the US and in the Northeast. Thus the continued competitiveness of specialty crop production is a key issue in maintaining a viable agriculture in rapidly urbanizing areas.

# Chapter 1

## **Report on Listening Sessions\*** **by** **Nelson Bills and Gerald White\*\***

This chapter summarizes Phase I of the project “2007 Farm Bill: Policy Options and Consequences for Northeast Specialty Crop Industries, Small Farms, and Sustainability”. The purpose of Phase I was to solicit information and feedback on specialty crop industry members’ views and preferences with respect to the upcoming 2007 Farm Bill. Several aspects of Federal support for specialty crop producers are considered. This information will be used to gauge responsiveness to a wide set of policy options and possible directions for titles that might be incorporated into the next farm bill. These options and directions range from direct income support to enhanced environmental and conservation programming that is tailored to the needs of specialty crop producers. The geographic focus of this report encompasses the Northeastern US, defined here to include 12 states—Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and West Virginia.

To accomplish this task, we organized a series of listening sessions and administered a mail survey that focused on the views and opinions of representatives from specialty crop organizations across the Northeast region. We complemented these activities with contacts with individual growers, extension educators, members of the agribusiness community, and state agricultural officials. Table 1 describes the four listening sessions that were held. The backbone of our information gathering effort was a mail survey that was administered to 75 agricultural organizations across the region (see appendix A for a copy of the survey). This survey was comprehensive in the sense that we contacted all organizations that we could identify after reviewing web sites maintained by state departments of agriculture in all 12 Northeast states. We asked either the organization’s president or the managing director to complete the survey questionnaire. In many cases, these individuals indicated that they completed the questionnaire after canvassing the views and opinions of their membership. We received survey responses from 37 organizations, nearly 50% of the organizations contacted.

The organizing principles for the listening sessions and survey of commodity organizations included our own definition of specialty crop agriculture and close adherence to the data collection design used in a national public preferences survey being sponsored by the Farm Foundation. With respect to the latter, we designed our questionnaire and oriented our listening sessions around a line of questioning laid out by the Farm Foundation effort. Our definition of specialty crops included the following categories: fruit, vegetables, floriculture, nursery, turf, maple syrup, Christmas trees, aquaculture, honey, and mushrooms.

Despite our concerted efforts, these data and information gathering methods may not be completely representative of the entire industry in the Northeast. The numerous commodities represented,

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\*\* The authors are professors in the Department of Applied Economics and Management, Cornell University, Ithaca, NY.

**Table 1. Summary of Listening Sessions**

Date	Type of Interaction	Number and descriptions of participants
19 Oct 05	Round table discussion	11 members of the W.I. Myers Advisor Council representing agribusiness firms (finance, cooperatives); producers, and farm organizations. (See Appendix B for notes from the listening session)
24 Oct 05	Conference call	13 commissioners or staffers from State Departments of Agriculture of 10 Northeast states. (See Appendix C)
26 Oct 05	Panel discussion	Four panelists at the annual New York Crop Insurance Workshop – Representative from MA, Cornell Cooperative Extension, an insurance consultant, and a crop insurance sales agent. (See Appendix D)
5 Dec 05	Conference call	Three representatives of the New York Farm Bureau. (See Appendix E)

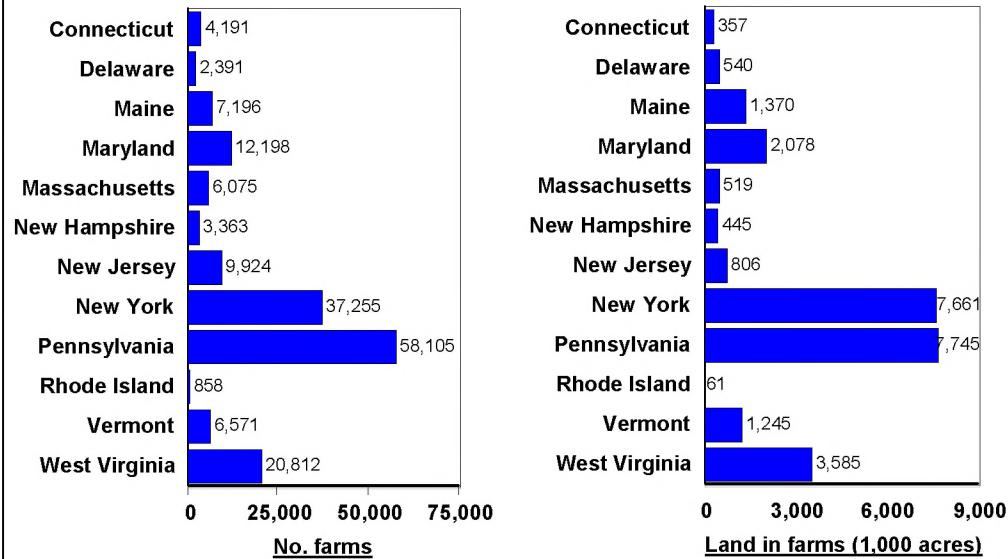
combined with the varied structure of farms engaged in production, necessarily means that the community of specialty crop growers and their interests is varied and quite fragmented. However, we were clearly able to engage with numerous influential members of these industries. We were able to identify and articulate common threads that emerge around concerns with Federal agricultural policy and the repercussions for specialty crop industries.

### **Specialty Crop Production in the Northeast**

To provide context for the policy discussion that follows, we summarize the most recent Census data to highlight some of the most salient features of Northeast agriculture and the role of specialty crop production. As noted above, specialty crop industries are very heterogeneous, both in terms of crops grown and marketing channels used to move that product into local, regional, national, and international markets. Although the Northeast is the nation's most densely populated region with considerable territory poorly suited to modern farm and food production, the 12-state area includes nearly 170,000 farms according to the 2002 Census of Agriculture (see Figure 1). These farm units have a land base of about 26.4 million acres; this represents 21% of the region's total land area. While not demonstrated here, the region has experienced a well-documented and much discussed reduction in farms and farmland since World War II. Some of this territory is now in developed uses but immense acreages have reverted to brush or forest cover. Today, well over 60% of the Northeast is classified as forestland.

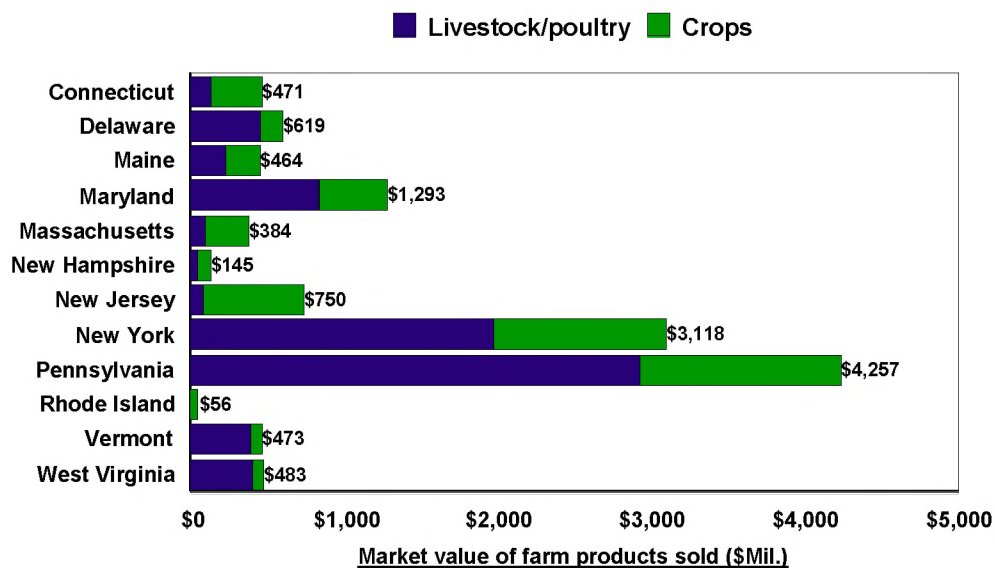
Referring once again to Census data, the market value of farm products sold in the 12-state area topped \$12.5 billion in 2002 (Figure 2). Crop sales accounted for \$4.8 billion or 38% of total farm product sales. Not unexpectedly, approximately 60 % of all crops sales in the Northeast originate in New York and Pennsylvania. However, a noticeable contribution comes from Maryland and New Jersey; similarly, a noticeable amount of crop sales originate in Connecticut and Massachusetts.

**Figure 1. Farms and Land in Farms,  
Northeastern US, 2002**



Source: 2002 Census of Agriculture

**Figure 2. Market value of farm products  
sold, Northeastern US, 2002**

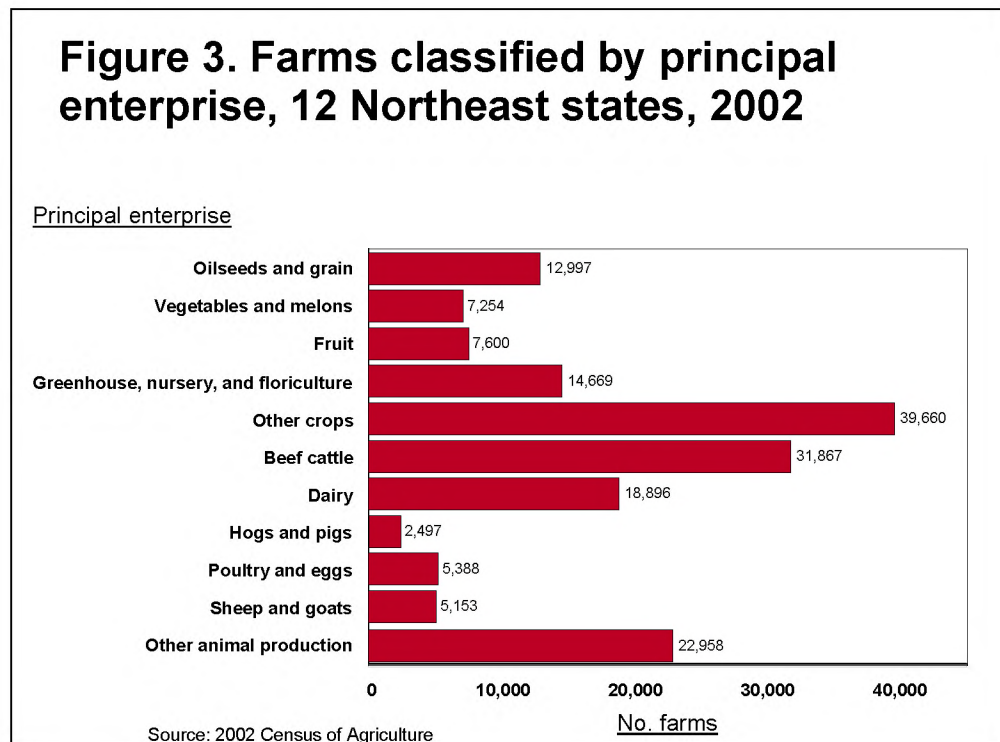


Source: 2002 Census of Agriculture

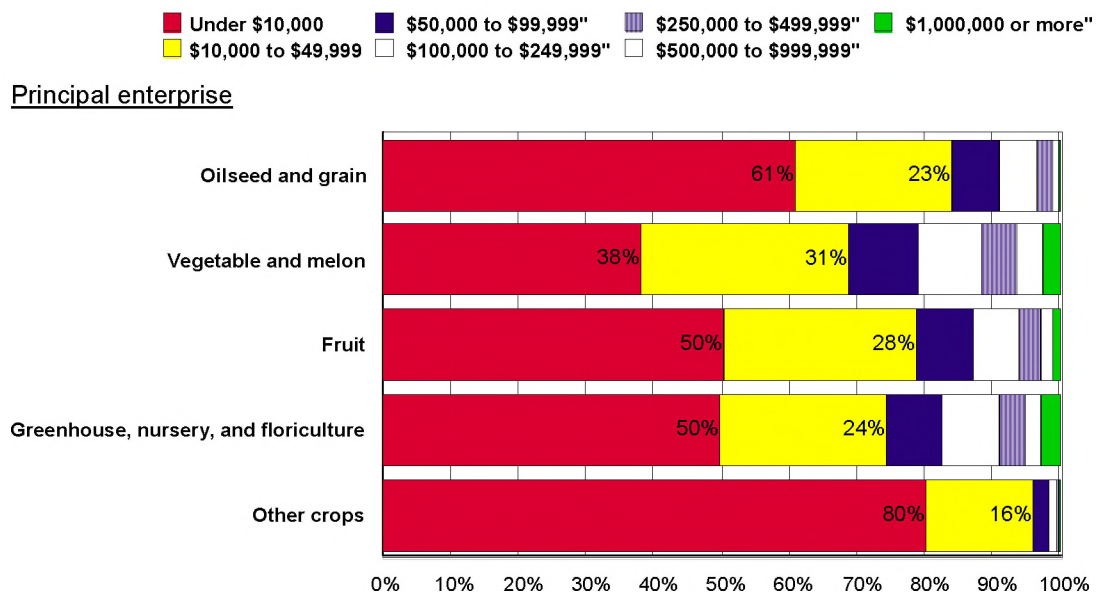
Because of product diversity and gaps in data, the presence of specialty crop industries identified for this study is not completely transparent in Census information. For purposes here, we rely on census data organized by principal commodity. As in years past, the 2002 Census classifies farms based on the pattern of cash receipts. Following this procedure, as shown in Figure 3, the Northeast has more than 29,000 farms principally engaged in the production of vegetables/melons, fruit, nursery, greenhouse, and floriculture crops. In addition, some specialty crop production obviously occurs on farms categorized as “other crop farms” or on farms principally organized as livestock or poultry farms.

The scale of specialty crop production is highly varied as well. Census data suggest that the distribution of specialty crop farms by size is bimodal with large numbers concentrated at the economic margin with sales of \$10,000 or less (see Figure 4). Census data show that the percentage of farms with sales under \$10,000 per year are 38, 50, and 50%, respectively, for vegetable, fruit, and greenhouse/nursery/floriculture operations. At the other extreme, many specialty crop farms in the region are organized on a large-scale. In addition, some growers are growing their businesses by exploiting economic interests in direct marketing, transport, food processing and other value added activities.

There are also significant differences among Northeast states in terms of specialty crop production. The Northeast has significant percentages of the national production and highly visible commodity groups for apples, juice grapes, blueberries, cranberries, sweet corn and other vegetables, maple syrup, and potatoes. Less well recognized is the presence of Northeast growers in numerous other specialty crop areas. For important examples, refer to Figure 5, which shows state ranks in acreage/area used to produce a large variety of specialty crops.



**Figure 4. Farms classified by principal enterprise and dollar amount of farm products sold/government payments, 12 Northeast states, 2002**



Source: 2002 Census of Agriculture

**Figure 5. Specialty crops with a national rank of 10 or higher, 12 Northeast states, 2002**

Commodity	New England	Delaware	Maryland	New Jersey	New York	Pennsyl- vania	West Virginia
.....State rank based on acreage/area, unless otherwise noted.....							
Potatoes	6						
Broccoli	4				8		
Cucumbers and pickles				4			
Eggplant		7	8	9	5		
Green peas		7	8	9	5		
Pumpkins	5				4	3	
Snap beans					3	10	
Squash	5			7	6		
Sweet corn					4	10	
Tomatoes				8		9	
Apples	7				2	5	10
Grapes					3	6	
Peaches				4		7	
Pears					4	5	
High Bush blueberries				2	10		
Wild blueberries	1				2	3	
Cranberries	2						
Raspberries	5				7	6	
Strawberries	8				5	6	
Nursery/greenhouse- under cover	9					3	
Nursery/greenhouse- in open				10		8	
Floriculture crops- under glass	7				9	6	
Floriculture crops-in open	8			4	9		
Cut Christmas trees	7				5	4	
Nursery stock	7				6	5	
Sod harvested				9			
Greenhouse vegetables	8				6	7	
Maple trees tapped (number of taps)	1		10		2	6	

Source: Compiled from the 2002 Census of Agriculture

## **Specialty Crop Policy Issues**

Based on our discussions with commodity interests and reviews of recent developments in the Congress, the Specialty Crop Competitiveness Act of 2004 must constitute the point of departure for any discussion of specialty crop policy dimensions at the Federal level. This legislation has received little attention from Federal appropriators to date, but is specifically designed to address issues confronting the US specialty crops sectors. A focal point of the legislation is block grants intended to fund state-based initiatives to grow and sustain specialty crop production. In addition, the legislation calls for additional Federal support for agronomic research and methods for dealing with invasive species.

Our listening sessions elicited strong support for a fully funded Specialty Crop Competitiveness Act. To that end, it is somewhat likely that the emerging debate over the 2007 farm bill will engage on program elements embedded in this Act. To gain a broader perspective on the farm bill and its relation to specialty crop production, we administered a survey questionnaire that, at the outset, asked each respondent to indicate their preferences for more direct Federal support for specialty crop industries. Among 37 respondents, 20 indicated a preference for considering direct financial support for specialty crops while the remaining 17 respondents did not support direct Federal support involvement in specialty crop production. In the discussion that follows, we first characterize the rankings assigned by those who indicated a preference for considering direct financial support for specialty crops. Then the opinions expressed by all 37 respondents are summarized.

For respondents answering affirmatively, we asked for a ranking of program options. The options offered to each respondent were direct payments, countercyclical payments, marketing loans, subsidized insurance, and disaster assistance. Average rankings by growers for these broad policy options are shown in Figure 6. Respondents registered a clear preference for programs oriented towards crop insurance and disaster assistance. The highest rank was afforded disaster assistance. Marketing loans were ranked third, followed by the possibility of countercyclical payments--direct payments to specialty crop growers that would mimic current Federal policy under the Farm Bill commodity title. These results were generally echoed in our listening sessions. Several participants in the sessions were generally opposed to, or at least expressed strong reservations, about a farm bill design that would incorporate specialty crop production into a more traditional commodity support régime experienced in years past for Federal “program crops”.

## **Summary of Farm Bill Preferences**

In general, while preoccupied with Federal farm legislation, our listening sessions had a relatively broader focus. Participants clearly recognized that a number of issues that are significant for specialty crop growers eclipse the Farm Bill and must be dealt with under separate Federal legislative and/or regulatory initiatives. An important example was Federal policy regarding immigration, agricultural labor availability and access to farm workers. These matters are only dealt with peripherally under Federal Farm Bill legislation and require separate legislative and regulatory initiatives, not the least being attempts at immigration reform. Numerous trade issues of considerable importance to specialty crop producers (e.g. Trade Adjustment Assistance and export



assistance programs) are also beyond the direct purview of Federal farm legislation and instead, must be dealt with in the context of bilateral or multi-lateral trade agreements. The same might be true to some extent for Federal insurance programs pertinent to specialty commodities.

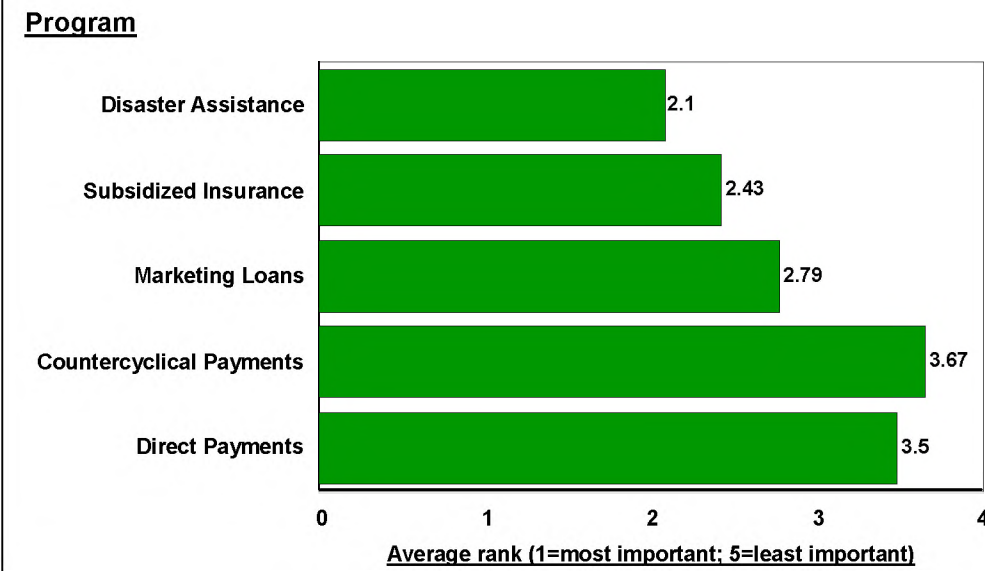
Broad based concern was expressed about the sustainability of Federal outlays to support the US farm industry. Continual discussion in the popular press, agency circles, and in the academic community has taken its toll. Survey respondents and participants in our listening group sessions were asked to address the prospects for reduced or reallocated Federal funding (Figure 7). Weakest support for program maintenance fell in the categories of direct financial assistance traditionally enjoyed by producers of Federal program crops: fixed decoupled crop payments, crop payments tied to price, and crop payments tied to price and production level. Relatively more support was registered for trade adjustment assistance programs and categories of Federal conservation programming. For the latter, this includes land retirement programs as embodied in the Conservation Reserve Program (CRP), Wetlands Reserve Program (WRP), and the Grassland Reserve Program (GRP). Noticeably more support was in evidence for Federal conservation programs for working lands-- the Environmental Quality Improvement Program (EQIP), wildlife habitat improvement program (WHIP), and the fledgling Conservation Security Program (CSP) along with agricultural land preservation programs.

Listening group sessions clearly reinforced these tendencies for the region but amplified on the implications for policy. Namely, growers and their supporters clearly recognize the tension between more public support for crop or income insurance, on the one hand, and the clamor for disaster assistance from communities of growers who resist participation in subsidized insurance program efforts on the other.

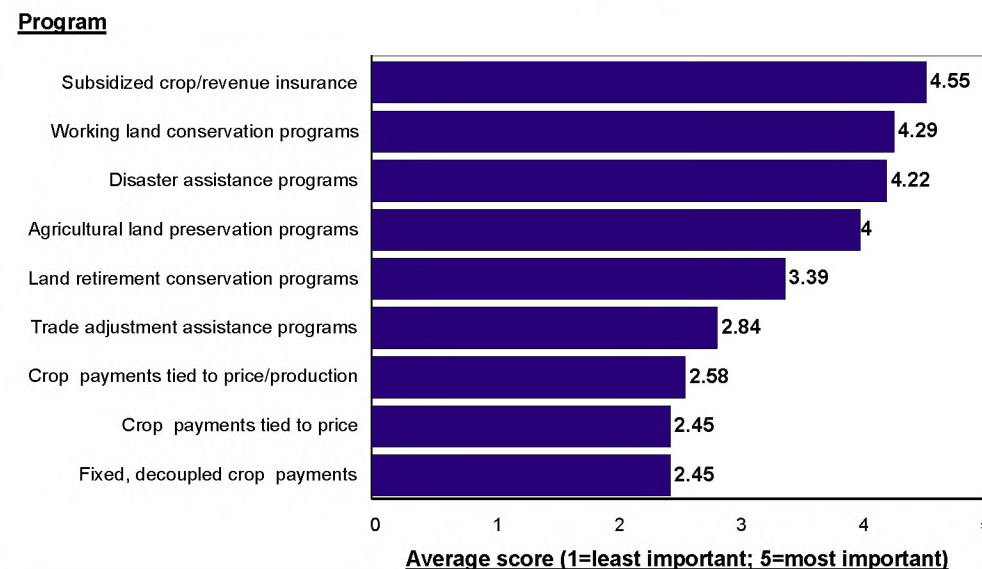
Despite pessimism over the trajectory of Federal funding for American agriculture and pending trade disputes under the aegis of the World Trade Organization (WTO), survey respondents and listening group participants alike were willing to engage on the prospects and directions for new or reallocated Federal funds. Survey results are shown in Figure 8. This line of questioning afforded survey respondents another opportunity to register their concern over direct financial assistance to growers of specialty crops via crop payments tied to price/production or to levels of farm income. Very limited interest in these initiatives was detectable in the context of prospects for new or reallocated funding. Stronger support was registered for a suite of new initiatives that could include incentive payments for bio-energy production; payments tailored to smaller family farms; food safety programs; and farmer-owned, tax deferred savings accounts.

Not surprisingly, considering strong support for Federal intervention to subsidize insurance and indemnify growers in times of natural disaster, respondents to our survey showed substantial interest in a variety of possibilities for increased Federal funding for risk management programs (see Figure 9). Based on the survey responses, it is not possible to significantly discriminate between risk management policy options. Respondents slightly favored increased tax deferred savings accounts over increased spending for higher coverage levels and subsidies for crop and revenue insurance. One listening session held with crop insurance agents and other agribusiness personnel made strong arguments for improvements in Adjusted Gross Revenue (AGR) and AGR-Lite crop insurance. AGR-Lite is generally considered to be an insurance policy that is well adapted to diverse cropping farms, especially direct marketing operations, with small acreages of

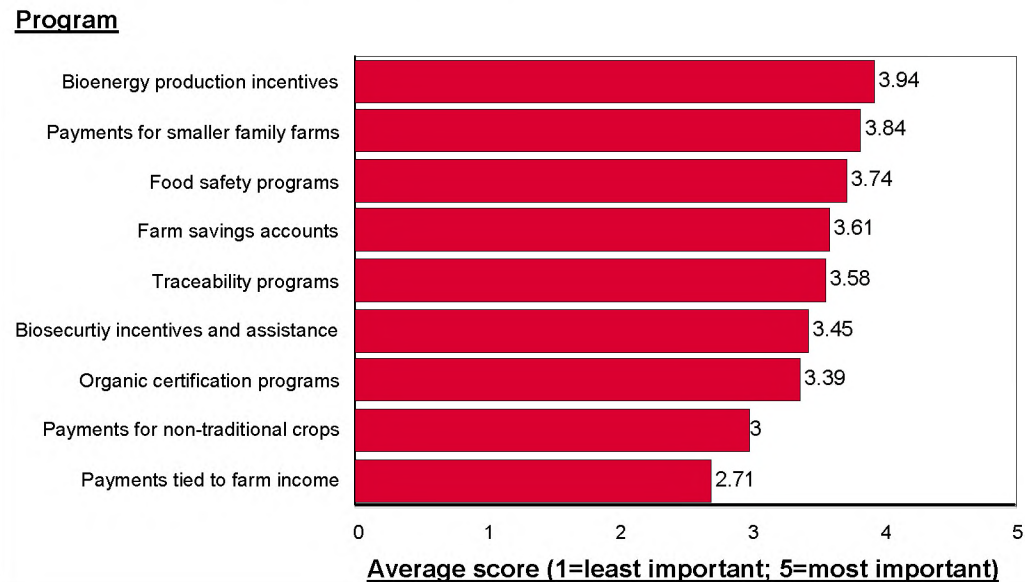
**Figure 6. If you agree that Federal support for specialty crops is warranted, rank the importance of these programs from high to low (N=20))**



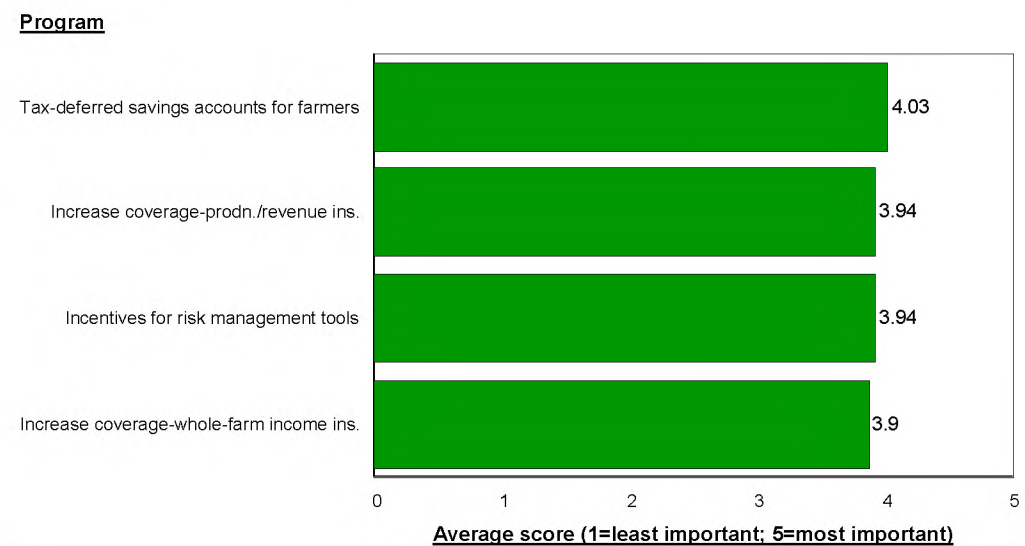
**Figure 7. The 2007 Farm Bill may need to reduce or reallocate federal funding for current farm programs. Please indicate how important you feel it is to keep funding for the following programs at or above current levels (N=37):**



**Figure 8. The 2007 Farm Bill may support new programs with new or reallocated federal funding. Please indicate how important you feel it is to provide new or reallocated funds for the following programs (N=37):**



**Figure 9. If federal funding for risk management programs is increased, which approaches are most preferred? Please indicate how important you feel it is to support the following alternatives (N=37):**



many different crops. In these situations, which are characteristic of many farms in the Northeast, traditional crop insurance policies either are not available for many of the crops grown, or in the eyes of producers do not work well for specialty crops.

The specialty crop community in the Northeast is highly attuned to issues related to environmental management and agriculture. Along with long-lived efforts to control soil erosion and improve water quality, the Northeast states were early adopters of programs to encourage farmland retention. State farmland retention policies in the Northeast date back to the 1950s. The general sense from our survey and listening sessions is that the USDA has an acceptable suite of conservation programs but that more could be done to tailor these programs to the concerns and specialty crop needs in the 12 Northeast states in some cases. Such concerns are borne out by the record. For example, the flagship USDA conservation program-- the CRP-- has not proved to be attractive to landowners in the Northeast. Only nominal amounts of highly erodible land have been enrolled in the CRP. Interest has been substantially higher for a variety of working lands conservation programs, including EQIP, WHIP, and the more recent pilot implementation of the Conservation Security Program (CSP) but, again, progress has been relatively slow in the Northeast. For example, the Northeast has only one pilot watershed CRP enrollment at this point. EQIP, on the other hand, targets several critical Northeast conservation issues-- water quality in particular-- but is oversubscribed. Concerns were also expressed about some of the administrative and regulatory details of programs, which, in some cases, appear to disadvantage specialty crop growers. Examples included program participation strictures based on the amount of impervious surfaces, affecting eligibility of greenhouse operators for federal farmland protection funding.

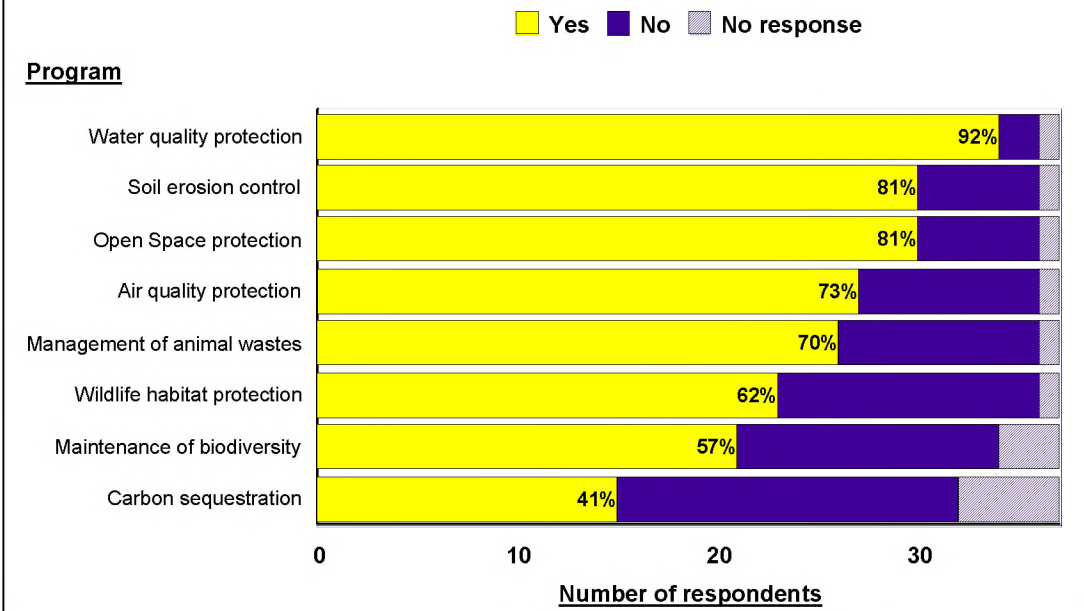
Our listening sessions devoted considerable attention to conservation matters and uncovered significant interest and concern. Responses to our survey of growers' organization are reported in Figure 10. More than 8 of every 10 respondents voiced support for the modification of Federal conservation programs to increase benefits for water quality protection, soil erosion control, and open space protection. Noticeable support is also present for efforts to deal with air quality and management of livestock wastes.

### **Implications and Conclusions for Policy Options**

Our research (both the survey and the listening sessions) led to the following conclusions about farm policy that are supported by and for specialty crop interests:

- Specialty Crops interests are not generally in favor of traditional program crop instruments (e.g. price supports, regulated prices, loan rates, deficiency payments, countercyclical payments, etc.).
- Specialty Crops interests are generally strongly in favor of subsidized revenue insurance policies (e.g. AGR and AGR-Lite) or alternatives such as subsidized counter cyclical, tax deferred savings accounts. A slight preference was expressed for tax deferred savings accounts over higher subsidies or higher coverage levels for crop and revenue insurance.
- There are mixed results regarding support for disaster assistance. Some Specialty Crops interests see the need for a continuation of disaster assistance (according to the results of our survey). Others take the view that disaster assistance is ad hoc, making it difficult for producers to make rational business planning decisions about risk management.

**Figure 10. Considering the following environmental goals, should federal conservation programs be modified to increase benefits for landowners in the Northeast states (N=37)?**



- There is generally strong support for conservation type programs that are better tailored for Specialty Crops resource situations.
- There was considerable support for new initiatives that could include incentive payments for bio-energy production, payments tailored to smaller family farms, food safety programs, and farmer-owned, tax deferred savings accounts.

One of the most important issues that federal farm policy might address for the Northeast is the competitiveness of specialty crops. A thriving specialty crops sector addresses many problems and rural-urban fringe issues including land and water allocation, a viable agriculture in the Northeast, and preservation of open space in suburban areas and around the major metropolitan centers. From past research (Brooks and Heimlich), we know that specialty crops thrive in metro areas, in contrast to traditional crops and concentrated dairy and livestock operations. Development to support a growing suburban population competes for agriculture in the land and labor markets. Land prices are bid up, causing property taxes to increase. These pressures force farm operators to seek enterprises and markets that offer higher net returns. Higher land values and increased equity allow loans for increased investment to take advantages of the opportunities for high valued crops that can be sold through specialized market niches or directly to consumers. Direct marketing operations increasingly cater to agri-tourism.

There are some negatives for farmers, of course, such as a reduced farm labor supply, especially at relatively low wage levels, but there are also increased employment opportunities for both the farm family as well as for employees in value added enterprises. While there are nuisance problems (e. g. pesticide drift) they may not be as severe as those associated with concentrated dairy and livestock operations. It is not surprising that farms in metro areas nation-wide produce more than two-thirds of the farm sales in fruit and vegetables as well as more than three-fourths of nursery and greenhouse sales. In Chapter 3 of this research bulletin, we will analyze in detail the important role that specialty crops have in metropolitan (MSA) counties of the Northeast.

### **References**

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## **Chapter Two**

### **Farm Savings Accounts for Specialty Crop Growers\***

**by**

**Brent A. Gloy and Mei-Luan Cheng\*\***

#### **Introduction – Farm Savings Accounts**

Managing the financial risk associated with farming is a central concern for farmers. Farm revenue insurance products have shown promise in helping farmers manage income risk and comprise an important component of the federal farm safety net. However, there is evidence that specialty crop growers are not completely satisfied with the risk protection provided by existing crop insurance policies (White, Uva, and Cheng, 2003). Farm savings accounts are a related product that may have considerable appeal to specialty crop growers.

Farm savings accounts are based upon the idea of providing producers financial incentives to set aside funds in high income years for use in low income years. Like revenue insurance products, most farm savings account proposals rely upon tax records to determine eligibility for contributions and withdrawals from the accounts. Unlike revenue insurance products, the producer does not pay a premium, but rather places funds in a deposit account. These funds remain the property of the producer. Additionally, deposits to the account may be tax deferred, and/or matched by a deposit from the government. Although the cost of a savings account program will depend upon the specific design, farm savings accounts may also appeal to policy makers because the cost to the federal government is likely to be relatively low compared to direct subsidy programs and emergency financial assistance.

A variety of farm savings accounts proposals have been advanced in the United States and in other countries<sup>1</sup>. The general idea behind farm savings accounts is to provide farmers incentives to save funds in high income years for use in low income years. The most commonly suggested incentives include tax deferral and/or a government matching deposit. Proposals for matching deposits often contain provisions that limit withdrawals from the accounts to years in which income falls below a specified trigger level.

This research project evaluated two specific proposals, counter-cyclical farm savings (CC) accounts and farm and ranch risk management (FARRM) accounts. Both proposals require that the farmer deposit funds into the account. Under the counter-cyclical savings accounts program, eligibility is based upon gross income from farming (line 11 of

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<sup>1</sup> Edelman, Monke, and Durst; Monke and Durst; and Ellinger and Gloy provide a discussion and analysis of the various types of farm savings account proposals. Makki and Somwaru describe farm savings account experiences in Canada and Australia.

Schedule F, Form 1040), the government would match the farmer's deposit up to \$5,000, and farmers could withdraw when gross income fell below a specified trigger level. For FARRM accounts, eligibility to participate was based upon positive net income and deposits were not matched, but rather were tax deferred. Withdrawals from the accounts were evaluated using various historical gross income trigger levels.

### **Data Used in the Analysis of FARRM and CC Accounts**

This study used the data collected by Lake Erie Grape Farm Cost Study (LEGFCS) to analyze the proposed farm saving account programs. The analyses focused on two specific savings account proposals. The proposals considered are often referred to as farm and ranch risk management accounts (FARRM) and counter cyclical savings accounts (CC). The data set contains grape farms that had completed the survey for each of the years 2000 to 2004. The five-year panel contains the financial records of 32 grape farms. The data collection was based upon tax information from growers' IRS Form 1040, Schedule F information (White and Shaffer, 2003). Because the implementation of both FARRM and CC account proposals would rely upon tax information, the present study considers the variability in measures of taxable income from farming. These measures do not necessarily reflect the actual or accrual profitability of the farms under consideration.

Most of the farms in the Cost Study are located in western New York and about a third are located in western Pennsylvania. All 32 farms specialize in grapes produced from native varieties (mainly Concord and Niagara) and marketed for juice. Over the five years in the study, the simple average of Schedule F Gross Income was \$161,981 per farm. Average net income from farming was \$17,365 per farm. Thus the results from this study are not reflective of all agriculture in New York or the United States. The results should be looked upon as a case study of a particular group of specialty crops producers.

Two measures of farm income were calculated to assess several aspects of the proposed farm savings account programs. An important difference between FARRM and CC accounts is that they are based on different measures of income to determine eligibility. FARRM accounts are driven by a measure of net income, while CC accounts are driven by a measure of gross farm income.

Similarly, the benefits for the programs differ. The main benefit from FARRM accounts is tax deferral and possible tax exemption, while CC accounts provide farmers a matching government deposit. Finally, the ability to withdraw funds is different for the accounts. Withdrawal from FARRM accounts is not restricted, while withdrawal from CC accounts is subject to shortfalls from a gross income target. Each of these issues is examined for both of the accounts. Therefore, the analysis focuses on addressing four broad questions. Specifically, we analyze:

- 1) variability in the measure of net farm income, i.e., line 36, net farm profit or (loss) of Schedule 1040 F (FARRM) and variability in the measure of gross farm income, i. e., line 11, Schedule 1040 F (CC ),



- 2) the ability of farmers to contribute to FARRM and CC accounts; and,
- 3) withdrawals from and benefits obtained by contributing to FARRM and CC accounts;
- 4) the impacts of the FARRM and CC accounts on shortfalls and income stabilization

The report proceeds by first analyzing FARRM accounts, then CC accounts are considered. The analysis of each account begins by describing the proposal. Then the variability of the appropriate income measure is described, gross income for FARRM and net income for CC accounts. Based on the assumptions about eligibility, the analysis considers how frequently farms would be eligible to make deposits and the magnitude of the deposits for which producers are eligible. Because the benefits of FARRM are tied to tax deferral, the FARRM analysis considers the income tax liability of the farms in the study. Then, the study examines the extent to which farmers are eligible to make withdrawals from the accounts and the extent to which the available account balances would cover the needed withdrawals. Each section concludes by examining the impact of the accounts on farm income variability. The analysis does not consider any income other than farm income and makes no allowances for deductions for state income tax or self-employment taxes or other credits. A substantial portion of the household income of farm operations is derived from off-farm sources. The exclusive reliance on farm income in the analysis was a necessary assumption given that complete household income data and tax data other than from Schedule F from the farms in the Lake Erie Grape Farm Cost Study were not available.

### **FARRM Accounts**

The FARRM account proposal uses tax deferral as an incentive for farmer saving. Although a variety of proposals have surfaced, the analyses in this report follow the basic idea that FARRM accounts would allow farmers to take a Federal income tax deduction for a deposit of up to 20 % of eligible farm income. Eligible farm income is defined as taxable net farm income from Schedule F of IRS Form 1040 (Durst, 2004). The measure of *net income* used in the analysis is calculated as:

$$(1) \text{ net income} = \text{Schedule F gross farm income} - \text{Schedule F farm expenses}$$

with

$$\text{Schedule F gross farm income} = \text{cash receipts from the sale of farm products}$$

$$\text{Schedule F farm expenses} = \text{cash expenses} + \text{depreciation}$$

In order to understand the potential benefit of FARRM accounts, it is important to examine the net income variability faced by farmers. The descriptive statistics for net income provide a straightforward examination of net income fluctuations. Table 2 presents the summary of net income among Lake Erie grape growers between 2000 and 2004. There is a substantial amount of net income variability over the five-year period. The average net income ranges from \$14,125 to \$20,657. For the panel, the standard

**Table 2. Descriptive Statistics of Net Income by Year, 32 Grape Farms in Lake Erie Region.**

Year	Mean	Std. Deviation	Minimum	Maximum
2000	\$14,125	\$28,486	(\$44,275)	\$75,795
2001	\$18,965	\$23,980	(\$49,079)	\$60,978
2002	\$17,929	\$27,663	(\$53,662)	\$74,359
2003	\$20,657	\$41,934	(\$54,757)	\$139,671
2004	\$15,148	\$24,041	(\$40,750)	\$53,950
Total	\$17,365	\$29,680	(\$54,757)	\$139,671

deviation of net income is greater than the mean, indicating a wide dispersion in the amount of variability experienced by these farms. The standard deviation as a measure of volatility implies that the year-to-year net income variability at the individual farm level could be even greater than the variability shown by a group of farms. There are several factors that might cause variation in net income from year to year. These would include price changes (both input and output), variation in production levels, and changes in farm size.

#### ***FARRM Accounts: Eligibility, Deposits, and Participation Incentives***

The analysis of FARRM accounts considered whether farmers would be eligible to place deposits in the account, the magnitude of eligible deposits, and producers' incentives for making deposits.

##### Eligibility

The eligibility to make a deposit to a FARRM account is dependent upon the farm having a positive net income. That is,

*(2) Eligible to contribute to a FARRM account, if net income > 0*

The first step in the analysis was to examine how frequently individual farms would be able to contribute over the 5-year period. Two farms were never eligible for the FARRM program due to having negative net income for 5 consecutive years. That is, 93.8% of farms are eligible to establish FARRM accounts. Because these farms were not able to establish an account over the 5-year period, the subsequent FARRM account analyses exclude these farms. The results in Table 3 show the percent of farms able to make up to 5 contributions to a FARRM account. Thirty-seven percent of farms would be eligible to contribute for the entire period. The results also indicate that many growers would find years when they are unable to contribute to a FARRM account. This would suggest that they would want to withdraw income from the accounts in these years to offset the low net income.

The proportion of farms with a positive net income to be eligible for FARRM accounts also varies by year (Table 3). The smallest proportion of farms would qualify in 2003 when only 63 % of farms had a positive net income. The results would suggest that in any given year we would expect nearly 75% of the farmers to be eligible to make a contribution.

**Table 3. Percent of Farms with Net Income Enabling them to Contribute to FARRM Accounts, 30 Grape Farms in Lake Erie Region, 2000-2004.**

Number of Years Qualified to Contribute	% of Farms
1	3.3
2	10.0
3	26.7
4	23.3
5	36.7

Although well over half of the farms would be eligible to contribute to a FARRM account every year, it is important to remember that many farms will show a positive net income and still pay no taxes because of standard or itemized deductions and personal exemptions. Thus, those farms with the low-income levels would have little incentive to contribute to FARRM accounts. The issues of tax deferral and tax deduction will be examined separately in the section of analyzing grower participation incentives. When calculating potential deposits to the accounts, this issue is not considered. Rather, the analysis considers whether growers would have positive net income to be eligible to contribute to FARRM accounts assuming that non-farm income would exactly offset the standard deductions available to the farm in the analyses of FARRM accounts.

#### Deposits to FARRM Accounts

The next step in the analysis was to calculate the amount of funds eligible for deposit. Eligible growers were assumed to contribute 20 % of their net income to the FARRM accounts. That is for any given year  $i$  the deposit was calculated according to (3),

$$(3) \text{ deposit}_i = 20\% * \text{net income}_i, \text{ if eligible to contribute in year } i.$$

There is some incentive to make such a deposit because the contribution can be withdrawn at any time and it allows the grower to defer the tax for a minimum of one year. For example, a grower could make a deposit in December of year 1, or likely up to April 15 of year 2, and then withdraw the funds early in year 2. Federal income taxes are then deferred for a year and, if the funds must be borrowed, only a few days of interest are incurred to obtain use of the funds. Additionally, the deposited funds are eligible to

earn interest making the net cost relatively small. Deferral opens the possibility that the grower could reduce the tax rate (possibly to zero) on some of the deposited funds, if their taxable income fell in the subsequent year(s). However, the estimates of deposits clearly overstate what might realistically be deposited since we assume that growers will participate fully if eligible and ignore the issue of tax deduction.

Under the 20% contribution rule, average annual deposits to FARRM accounts ranged from \$3,951 to \$5,519 (Table 4). As expected, the average deposits from year-to-year closely follow the average net income of the farms for that year. Also, a typical farm would annually contribute slightly over \$4,500 to the account over a 5-year period. Depending upon the tax bracket this would result in a small amount of tax deferral. The final balances in the account will depend upon the amount of the deposits that are withdrawn in any given year.

**Table 4. Percent of Farms with Income Enabling them to Contribute to FARRM Accounts and Deposit Summary of FARRM Accounts per Year, 30 Grape Farms in Lake Erie Region.**

Year	Eligible	Deposit			
	% of Farms	Mean	Std. Dev.	Minimum	Maximum
2000	73.3	\$3,951	\$4,635	\$0	\$15,159
2001	86.7	\$4,476	\$4,041	\$0	\$12,196
2002	80.0	\$4,606	\$4,337	\$0	\$14,872
2003	63.3	\$5,519	\$7,477	\$0	\$27,934
2004	76.7	\$4,078	\$3,557	\$0	\$10,790
All Year	76.0	\$4,526	\$4,967	\$0	\$27,934

#### Participation Incentives for FARRM Accounts

There are two important financial incentives to encourage FARRM account participation. The most basic benefit obtained by contributing to the account is the deferral of tax liability for one year or more. The ability to defer taxes to a tax year in which the farm is in a lower tax bracket would result in lower taxes, creating an incentive for contribution to a FARRM account. For instance, a farmer could contribute to a FARRM account in a year in which the income would be taxed at the 27% marginal tax bracket and then withdraw the funds in a year where they find themselves in a lower tax bracket (Table 5). Unless the tax rate on the funds in the year they are removed is less than in the year of the deposit, the advantage is the deferral of taxes. The deferral of taxes allows the farmer to invest the deferred taxes and earn interest income (which is taxable).

**Table 5. The Marginal Tax Brackets of Taxable Income.**

Marginal Tax Brackets	Income
0%	\$0
10%	\$12,000
15%	\$46,700
27%	\$112,850
30%	\$171,950
35%	\$307,050
38.60%	>\$307,050

The marginal tax bracket and a farmer's movement among the various brackets play critical roles in determining the ultimate value of FARRM accounts. The greatest benefit obtained from FARRM accounts occurs when farmers can contribute in years with a high tax liability and withdraw in years with a reduced tax liability. Although many of the farmers have a positive net income, the standard deduction will allow many farms to avoid tax liability. Growers whose net income is low are unlikely to pay income taxes, thereby reducing the incentive for participation.

In order to assess the tax situation, the grower's marginal tax bracket was determined with and without deposits to FARRM accounts and with and without standard deductions. The analysis assumes the standard deduction for a married couple filing jointly (\$7,850) and two personal exemptions (\$6,000) for a total deduction from net taxable farm income of \$13,850. This results in 4 possible scenarios. It should be remembered that the analysis does not consider any income other than farm income and makes no allowances for deductions for state income tax or self-employment taxes or other credits.

Table 6 shows the percent of growers in various tax brackets under the four combinations of taxable net income with/without deductions and with/without deposits to FARRM accounts. The table allows on to assess how the deductions might impact farmers' incentives to make deposits. The key to this analysis is to consider the change in the percent of growers that would be eligible to contribute to FARRM accounts if taxable net income is reduced by the amount of the standard deduction. In order to make this calculation one can compare the percent of growers in the zero marginal tax bracket under the case without deposits/without deduction (column 3) and the percent in the zero bracket without deposit/with deduction (column 5) in Table 6. After applying the deductions, the number of farms that would be eligible for FARRM accounts falls by 23.3 percentage points on average. This is a substantial decrease in the number of farmers that would receive any benefits from the accounts.

Table 6 also allows one to begin to assess the movement in tax brackets caused by contributions to FARRM accounts. In the cases without deductions and exemptions (columns 3 & 4), the contributions to FARRM accounts cause small proportions of the

**Table 6. Percent of Farms in Various Tax Brackets Assuming Taxable Net Income with / without Deductions and with / without Maximum Contribution to FARRM Accounts, 30 Grape Farms, 2000-2004.**

Year	Marginal Tax Brackets	Taxable Net Income			
		No Deposit	With Deposit <sup>A</sup>	No Deposit	With Deposit
		No Deductions	No Deductions	With Deductions <sup>B</sup>	With Deductions
2000	0%	26.7	26.7	60.0	63.3
	10%	30.0	36.7	3.3	6.7
	15%	26.7	30.0	30.0	26.7
	27%	16.7	6.7	6.7	3.3
2001	0%	13.3	13.3	40.0	46.7
	10%	26.7	30.0	20.0	23.3
	15%	43.3	50.0	33.3	30.0
	27%	16.7	6.7	6.7	-
2002	0%	20.0	20.0	40.0	53.3
	10%	13.3	23.3	20.0	16.7
	15%	53.3	46.7	33.3	30.0
	27%	13.3	10.0	6.7	-
2003	0%	36.7	36.7	50.0	53.3
	10%	10.0	13.3	16.7	20.0
	15%	30.0	26.7	10.0	13.3
	27%	20.0	23.3	20.0	13.3
	30%	3.3	-	3.3	-
2004	0%	23.3	23.3	46.7	46.7
	10%	20.0	23.3	13.3	23.3
	15%	43.3	53.3	40.0	30.0
	27%	13.3	-	-	-
Total	0%	24.0	24.0	47.3	52.7
	10%	20.0	25.3	14.7	18.0
	15%	39.3	41.3	29.3	26.0
	27%	16.0	9.3	8.0	3.3
	30%	0.7	-	0.7	-

<sup>A</sup> The net taxable income is deducted by the amount of grower's contributions to FARRM accounts

<sup>B</sup> The analysis assumes that net taxable farm income is subtracted by the amount of the standard deduction for married filing jointly of \$7,850 and two personal exemptions (\$6,000 total).

farmers to switch income tax brackets. For instance, no farms are found in the 30% bracket after the deposits and fewer are in the 27% bracket, with slightly more farmers in the 10% and 15% brackets. In the scenarios that consider deductions and exemptions (column 5 & 6), the contributions to FARRM accounts also cause relatively small proportions of the farmers to switch income tax brackets. Incorporating the deductions and exemptions with the FARRM accounts results in fewer farms with a tax liability. However, most of the shifts in income tax brackets occur from the highest tax bracket through the lowest. Generally speaking, no matter whether the tax deduction is subtracted or not, as a result of contributions to FARRM accounts, the farms initially found in the higher brackets are more likely to switch the tax brackets than farms initially found in lower tax brackets.

An analysis was also conducted to determine the percent of farms that switched tax brackets as a result of their contribution to a FARRM account. The analysis considers both the case where standard deductions were allowed and the case where they were ignored. Table 7 presents this analysis for each year of the study. For instance, the second column of Table 7 shows that in the year 2002, by making a deposit to the account, 13.3 % of the farms would benefit from a lower tax bracket if standard deductions are not considered. When the standard deduction was considered, making a deposit would cause 30 % of the farms switch to a lower bracket. Overall, the average proportions of farms switching income tax brackets over the entire period are 13.3% when the deductions are ignored and 20% when the deductions are considered (Table 7).

The number of times that making a deposit would cause a farm to switch tax brackets was also calculated. Table 8 shows these frequencies for the case where the standard deduction is considered and when it is ignored. These results further illustrate the findings previously presented in Table 6. Specifically, that making a FARRM deposit would not result in a great deal of tax bracket shifting. For instance, 50 % of the farms would never switch tax brackets with a deposit under the no standard deduction assumption. The percentage benefiting slightly increases when standard deductions are considered.

**Table 7. Percent of Farms Changing Income Tax Brackets as a Result of a Contribution to FARRM Accounts, by Year, 30 Grape Farms in Lake Erie Region.**

Year	Subtract Deductions from Farm Income	
	No	Yes
2000	16.7	13.3
2001	13.3	23.3
2002	13.3	30.0
2003	6.7	23.3
2004	16.7	10.0
All Period	13.3	20.0

**Table 8. Number of Years that Farms Switched Income Tax Brackets as a Result of Contributions to FARRM Accounts, 30 Grape Farms in Lake Erie Region, 2000-2004.**

Number of Years Income Tax Basket Change	Subtract Deductions from Farm Income	
	No	Yes
0	50.0	43.3
1	36.7	30.0
2	10.0	13.3
3	3.3	10.0
4	-	3.3
5	-	-

### *FARRM Accounts: Withdrawals and Benefits*

In order to estimate withdrawals from FARRM accounts and the benefits obtained by depositing funds in the accounts, one must make additional assumptions. In doing so it is useful to examine the possible motivations and benefits that might accrue by contributing to FARRM accounts. The most basic benefit obtained by contributing to the account is the deferral of tax liability for one year or more. Because the farmer must eventually withdraw the funds, the contribution is a deferral unless the contribution is withdrawn when the farmer is in a lower tax bracket resulting in taxation at a lower rate, possibly zero. The deferral of taxes allows the farmer to invest funds and earn interest income. The benefit of investing these funds can be expressed as:

$$(4) \text{benefit}_i = (\text{balance}_{i-1} + \text{deposit}_i) * (t_i)(r)(1 - t_i)$$

where *benefit<sub>i</sub>* is the net benefit in year *i* of deferring taxes on the amount available to withdraw in the account in year *i*, (*balance<sub>i-1</sub>* + *deposit<sub>i</sub>*), *t<sub>i</sub>* is the marginal tax rate in year *i*, and *r* is the rate of return earned on the deferred taxes. The benefit arises from the farmer's use of funds that would otherwise be paid to the government. This amount is the balance plus the deposit multiplied by the marginal tax rate. The analysis assumes that these funds are invested at rate *r*, and that earnings on those funds are distributed and taxed. Thus, the ultimate benefit is the earnings times 1 minus the marginal tax rate. The cumulative balance in the account was estimated by adding the maximum contribution in any year *i* to previous year's balance and subtracting any withdrawals from the account.

$$(5) \text{balance}_i = \text{balance}_{i-1} + \text{deposit}_i - \text{withdrawal}_i$$

Therefore, in order to estimate the benefit in any given year it was necessary to estimate the withdrawals from the accounts. Although withdrawals from FARRM accounts would be at the farmer's discretion, the relationship in equations (6)-(9) was used to estimate withdrawals from the accounts. We assume that withdrawals were made when current year income was less than 90% (or 80%) of the income target. In this case, the farmer would withdraw enough funds from the accounts to increase income to the 90% (or 80%)



level of the target. The withdrawal was the lesser of the balance in the account in the previous period plus the deposit in the current year and the need for funds. The need for funds to be withdrawn from the account is given by (7), where the parameter,  $\phi$  was assumed to be equal to 0.9 or 0.8 to represent the level of income target. The measure of income target in equation (8) was defined to represent a 5-year rolling average of income. Equation (9) defines income as either gross or net income. Under this mechanism farmers would use the accounts to smooth their income. The rules of withdrawal based on income targets can be summarized by (6).

$$(6) \text{withdrawal}_i = \begin{cases} \text{Min}[\text{need}_i, \text{balance}_{i-1} + \text{deposit}_i] & , \text{ if } \text{need}_i > 0 \\ 0 & , \text{ otherwise} \end{cases}$$

$$(7) \text{need}_i = \text{Max}[(\phi * \text{target}_i - \text{income}_i), 0], \quad \phi = 0.9 \text{ or } 0.8$$

$$(8) \text{target}_{1999+j} = \frac{\sum_{i=j}^{4+j} \text{income}_{1994+i}}{5} \quad j = 1, 2, 3, 4, 5$$

$$(9) \text{income} \subset \{\text{gross Income}, \text{net Income}\}$$

The study period covers the years 2000 to 2004, but the calculation of the target income requires data for the period of 1995 to 1999. This data was available for most of the farms in the panel. In situations where it was missing it was estimated from the relationship between the farms average returns and the group returns. The exact estimation procedure follows that described in Gloy, LaDue and Cuykendall.

Durst (2004) points out the implications of utilizing a tax-based measure of income for major farm savings account proposals. Normally farmers use cash accounting instead of accrual accounting for tax purpose. This flexibility with regard to the timing of income recognition, as well as other tax rules especially related to the recovery of capital investments, can have a substantial influence on the level and variability of both gross and net farm income. Farmers can accelerate or defer income or expenses to smooth income and avoid potentially higher marginal income tax rates that could apply under the progressive income tax system. This would reduce farm income variability. Thus, the assumptions of withdrawal based on Federal income tax data, especially if the criteria are based on net farm income rather than gross receipts, may not be a good indicator of the need to withdraw funds from the account. Therefore, to estimate the need to withdrawal effectively, the measures of income target were constructed for both gross income and net income. Gross income was the estimate of the gross schedule F income.

Two measures of income with another design parameter,  $\phi$  in equation (7) provide four scenarios of withdrawal as well as benefit of tax deferral for the analysis of FARRM accounts. The four scenarios can be denoted as 90\_net ( $\phi = .9$ , income = *net income*), 80\_net ( $\phi = .8$ , income = *net income*), 90\_gross ( $\phi = .9$ , income = *gross income*), and

80\_gross ( $\phi=.8$ , income = *gross income*). For example, under scenario 90\_net, the amount of withdrawal from the account made in year 2003 could be calculated by (10).

$$(10) \ 90\_net_{2003} = (0.9 * \frac{\sum_{i=1}^5 (net \ income)_{1997+i}}{5}) - (net \ Income)_{2003}$$

There is another serious concern for farms that are experiencing growth in revenues over time. To recognize the growth of farm business, using the five-year rolling average gross income as the income target, might not represent the most scale of the farm business and therefore understate growers' effective need. Considering this situation, we use the indexing calculation developed for the Adjusted Gross Revenue (AGR) Crop Insurance Programs to obtain another measure of the income target<sup>2</sup>. This indexed income target is calculated by the index times the 5- year rolling average income target if the farm qualifies for indexing (11). The farm qualifies for indexing, if at least one of the two most recent years of gross income is greater than 5-year average gross income, in which case the income target may be adjusted upward (12). If the farm does not qualify for indexing, the income target remains 5-year rolling average gross income.

$$(11) \ index \ target_{1999+j} \begin{cases} = index * \frac{\sum_{i=j}^{4+j} (gross \ income)_{1994+i}}{5} & j = 1,2,3,4,5 \quad \text{if } qualify \\ = \frac{\sum_{i=j}^{4+j} (gross \ income)_{1994+i}}{5} & j = 1,2,3,4,5 \quad \text{otherwise} \end{cases}$$

(12) *qualify in any given year (1999+j), iff*

$$(gross \ income_{1999+j} \text{ or } gross \ income_{1998+j}) > \frac{\sum_{i=j}^{4+j} (gross \ income)_{1994+i}}{5} \quad j = 1,2,3,4,5$$

where *index* is calculated as follows:

1) Divide each year's income by the preceding year's income = factor, which is no less than .800 and no greater than 1.200. 2) Take average of total factors = factor average. 3) Take fourth power of factor average = index.

By using the indexed income target in (11) to recognize the growth of farm business, we add two more scenarios of withdrawal as well as benefit in the analysis. These two

<sup>2</sup> A description of AGR and the income indexing procedure can be found on the USDA, Risk Management Agency website, RMA (<http://www.rma.usda.gov/>) or is available from the authors.

scenarios will be denoted as 90\_index, given  $\phi=0.9$ , income= gross income, and the index target and 80\_index, given  $\phi=.8$ , income= gross income, and the index target.

Under scenario 90\_index, if a grower qualifies for the indexed income target, the amount of withdrawal from the account made in year 2003 is calculated according to:

$$(13) \ 90\_index_{2003} = 0.9 * index * \frac{\sum_{i=1}^5 (gross \ income)_{1997+i}}{5} - (gross \ Income)_{2003}$$

### Withdrawals and Benefits of Tax Deferral

Given two measures of income (net income and gross income), the level of income target (90% and 80%) and the indexed income target, six scenarios were analyzed to estimate withdrawals and benefits for FARRM accounts. Withdrawals from the accounts were estimated assuming that when income in the current year is less than 90% (or 80%) level of the income target, farmers have the need (*need<sub>i</sub> in equation (7) > 0*) to withdraw funds to smooth income.

Table 9 shows the percent of growers having the need to withdraw funds from FARRM accounts by year. Because the 90% level of income target is higher than 80% level of income target, growers will withdraw funds more frequently under a 90% target. The only question is how many growers would benefit from a higher net income target. The results suggest that under a net income target the frequency that growers have the need to withdraw is not substantially greater than the 80 % target. Over the entire period, the average number of farms with a positive need was only 4.7 percentage points greater with a 90% net income target than with an 80% net income target.

The results also indicate that using gross income to set the target would be the most restrictive rule for estimating farmer's annual need to withdraw from FARRM account. Under an 80% gross income target, on average only 9.3 % were eligible to make a withdrawal. After indexing gross income to reflect growth in the farm business, the proportion of farmers with a need for withdrawals increases to 52.7% and 31.3%.

**Table 9. Percent of Farms Qualifying to Make Withdrawals from FARRM Accounts Under Various Income Targets, 30 Grape Farms in Lake Erie Region.**

Year	Withdrawal Scenarios					
	90 net	80 net	90 gross	80 gross	90 index	80 index
2000	50.0%	46.7%	3.3%	3.3%	63.3%	53.3%
2001	43.3%	43.3%	10.0%	23.3%	53.3%	30.0%
2002	40.0%	36.7%	30.0%	13.3%	53.3%	33.3%
2003	50.0%	46.7%	30.0%	6.7%	46.7%	33.3%
2004	56.7%	43.3%	30.0%	-	46.7%	6.7%
Entire Period	48.0%	43.3%	20.7%	9.3%	52.7%	31.3%

Table 10 shows how frequently individual farms had the need to withdraw from the accounts over the five-year period. This data indicates that the net and gross indexed income triggers produce similar results, but that the non-indexed gross income targets results in many farmers being unable to make withdrawals from the accounts. For instance, using a 80% gross income trigger 63.3% of the growers would be unable to make a withdrawal from the account.

**Table 10. Percent of Farms Having the Need to Withdraw Funds from FARRM Accounts, 30 Grape Farms in Lake Erie Region, 2000-2004.**

Number of years with the need to withdraw funds	Withdrawal Scenarios					
	90_net	80_net	90_gross	80_gross	90_index	80_index
0 yr	10.0	13.3	43.3	63.3	3.3	16.7
1 yr	16.7	20.0	23.3	30.0	20.0	30.0
2 yrs	20.0	23.3	20.0	3.3	10.0	40.0
3 yrs	33.3	26.7	13.3	3.3	50.0	6.7
4 yrs	16.7	13.3	-	-	10.0	6.7
5 yrs	3.3	3.3	-	-	6.7	-

The average withdrawals required to bring income back to the target vary considerably under the six scenarios (Table 11). The range of average withdrawal over the entire period is from \$670 under the scenario 80\_gross to \$3,060 under the scenario 90\_index. Given the nature of taxable farm income, it is actually difficult to decide which income target trigger would be the most meaningful for estimating withdrawals. Furthermore, withdrawals from the funds would be at the farmer's discretion. However, these six scenarios would provide the estimates of withdrawal that are necessary to estimate the balances in the accounts and the benefits of tax deferral.

**Table 11. Average Withdrawals from FARRM Accounts, 30 Grape Farms in Lake Erie Region.**

Year	Withdrawal Scenarios					
	90_net	80_net	90_gross	80_gross	90_index	80_index
2000	\$471	\$239	\$0	\$0	\$2,498	\$2,026
2001	\$3,219	\$2,085	\$412	\$29	\$3,172	\$1,090
2002	\$3,124	\$3,222	\$2,724	\$2,424	\$2,493	\$2,002
2003	\$1,835	\$2,506	\$2,692	\$679	\$4,257	\$2,657
2004	\$4,469	\$3,916	\$1,663	\$216	\$3,032	\$216
Entire Period	\$2,624	\$2,394	\$1,498	\$670	\$3,090	\$1,598

Equation (4) was used to calculate the potential earnings on the funds given the estimates of balance in the accounts, the estimates of deposit to the accounts, the income tax brackets, and an interest rate of 5%. The after-tax earnings on these funds are a net benefit to the farm. Table 12 shows the average benefits over the 5-year period obtained by the farmers under the six scenarios. The average benefits obtained through the tax deferral are quite small and less than \$100 under any scenario.

Furthermore, those estimates would overstate the benefits received by investing deferred taxes in any given year, because it does not consider any opportunity costs for the funds. For instance, if the farm could pay down debt with these funds, the benefits would likely be negative unless the rate of return in the account,  $r$ , is quite high. The results may imply that the benefits from the deferred taxes would not stimulate the grower participation for the FARRM account programs if bonus interest rates are not offered.

**Table 12. Summary of Annual and Cumulative Tax Deferral Benefits from FARRM Accounts, 30 Grape Farms in Lake Erie Region.**

Benefit Scenarios	Mean	Median	Std. Dev
90_net	\$68.5	\$29.6	\$101.0
80_net	\$73.0	\$31.4	\$106.0
90_gross	\$82.8	\$39.8	\$121.0
80_gross	\$86.0	\$41.5	\$123.0
90_index	\$57.6	\$25.5	\$98.0
80_index	\$71.2	\$33.2	\$111.0

When one considers the final balances remaining in the accounts it is obvious that the amounts of final balances would be negatively related with the amounts of withdrawal under the six scenarios. In the scenarios of 90\_gross and 80\_gross, FARRM accounts could offer the ability to build a sizeable self-insurance safety net over a period of several years. This is understandable as there were few withdrawals from the accounts in these two scenarios (Table 13).

**Table 13. Summary of Final Balances in FARRM Accounts, 30 Grape Farms in Lake Erie Region.**

Balance Scenarios	Mean	Median	Std. Dev.	Maximum	Minimum
90_net	\$9,512	\$3,660	\$14,012	\$52,776	\$0
80_net	\$10,663	\$3,660	\$15,116	\$57,542	\$0
90_gross	\$15,934	\$8,308	\$17,275	\$57,773	\$0
80_gross	\$19,282	\$12,266	\$17,928	\$57,773	\$0
90_index	\$7,199	\$2,556	\$11,392	\$54,265	\$0
80_index	\$14,639	\$7,684	\$16,298	\$57,773	\$0

### ***FARRM Accounts: Income Shortfalls and Stabilization***

While some farms could build positive account balances, a significant number of farms that experienced a drop in income sufficient to trigger a withdrawal would not have a large enough account balance to bring their income back to the target level. Analyses were conducted to determine if the balances in the FARRM accounts were sufficient to overcome major fluctuations in farm income. The amount by which the need for the withdrawal exceeded the balance was calculated according to (14).

$$(14) \text{shortfall}_i = \text{need}_i - \text{balance}_{i-1} + \text{deposit}_i, \text{ if } \text{need}_i > 0 \text{ and } \text{shortfall}_i > 0 \\ = 0, \text{ otherwise}$$

If the amount of funds in the account is not sufficient to fund the need, this grower would experience a shortfall (i.e.  $\text{shortfall}_i > 0$ ), and this grower's annual balance would become zero. The zero balance would leave the grower with no risk protection going forward. An indicator variable was created to count the frequencies of the shortfall (zero balance) for each of the four scenarios. This variable was recorded as a one if the shortfall is greater than zero and a zero otherwise.

Table 14 shows the percent of farms that experience a shortfall per year. The frequencies of shortfalls under the six scenarios are highly correlated with the frequencies of having the need to withdraw funds from FARRM accounts shown in Table 9. Because there are fewer withdrawals with a gross income target, the frequencies of shortfalls in the scenarios of 90\_gross and 80\_gross are substantially less than the other four scenarios.

**Table 14. Percent of Farms Experiencing Shortfall, 30 Grape Farms in Lake Erie Region.**

Year	Shortfall Scenarios					
	90_net	80_net	90_gross	80_gross	90_index	80_index
2000	43%	43%	3%	-	67%	50%
2001	27%	23%	7%	7%	43%	17%
2002	33%	23%	23%	13%	47%	30%
2003	50%	47%	20%	10%	43%	17%
2004	33%	33%	13%	3%	23%	3%
Entire period	37%	34%	13%	7%	45%	23%

Table 15 shows the conditional average shortfall calculated as  $E[\text{shortfall}_i | \text{shortfall}_i > 0]$ , which indicates the average amount of insufficient funds after making a withdrawal when a shortfall occurs. The average shortfalls over the entire period are substantial, ranging from \$17,862 to \$29,344. The scenarios of 90\_net and 80\_net have the lowest average shortfalls over the entire period. The conditional average shortfalls vary by year as well as by the scenarios, because large amounts of shortfall occurred for some of individual farms in a year or in a scenario. For example, the scenarios of 90\_gross and 80\_gross had

**Table 15. Average Annual Shortfall<sup>a</sup>, 30 Grape Farms in Lake Erie Region.**

Year	Shortfall Scenarios					
	90_net	80_net	90_gross	80_gross	90_index	80_index
2000	\$19,741	\$18,086	\$5,102	-	\$42,075	\$27,336
2001	\$10,928	\$9,980	\$41,680	\$31,102	\$18,149	\$22,081
2002	\$17,904	\$18,978	\$23,019	\$18,682	\$27,463	\$18,658
2003	\$20,247	\$17,893	\$21,200	\$20,002	\$31,768	\$38,963
2004	\$17,347	\$14,663	\$16,659	\$33,977	\$13,017	\$33,977
Entire period	\$17,862	\$16,372	\$22,171	\$23,092	\$29,344	\$26,205

<sup>a</sup>The shortfall is the amount by which the need for a withdrawal exceeds the available account balance.

only 2 growers (7%) experiencing the shortfalls in 2001, but had substantially larger average shortfalls (\$41,680 and \$31,102) than the other four scenarios.

The extent to which the FARRM account was capable of providing stabilization was assessed by comparing the shortfalls from the income target for farmers with and without FARRM accounts. The amount of shortfall with the existence of a FARRM account has been defined as (14). We assume that without a FARRM account, farmers would experience shortfalls when income is less than 80% level or 90% level of the target. That is, the need defined as (7) is greater than zero when a shortfall occurs. Therefore, the amount of shortfall without the existence of a FARRM account is defined as (15).

$$(15) \text{ Shortfall\_base}_i = \text{need}_i, \text{ if } \text{need}_i > 0 \\ = 0, \text{ otherwise}$$

Table 16 shows the average shortfalls, number of farms experiencing shortfalls, standard deviation of the shortfalls, and the maximum shortfalls with and without the existence of FARRM accounts. To compare the shortfalls with and without FARRM accounts, we calculate the change on descriptive statistics of shortfalls while FARRM accounts exist. Those changes can be interpreted as the effect of FARRM accounts on income stabilization.

Under the six scenarios, the FARRM accounts reduced 19% to 34% of the average shortfall over the entire period, 18% to 39% of number of farms experiencing shortfalls, and 5% to 14% of standard deviation of shortfall over the entire period. The small degree of change on the standard deviation is undesirable, because it may imply that FARRM accounts reduced a very limited amount of variation in shortfalls across farms. Also, scenario 90\_index had the least changes on those statistics compared to other three scenarios. This implies that using 90% indexed gross income target to set the withdrawal restriction could be too strict to show the effect of CC accounts on the income stabilization. It may also imply that 90% indexed gross income target overstates growers' needs for income smoothing.

**Table 16. Summary of the Shortfall with and without FARRM Accounts, 30 Grape Farms in Lake Erie Region, Continues.**

Year	Shortfall Scenarios with / without FARRM Accounts*																	
	90_net	90_net	Change	80_net	80_net	Change	90_G	90_G	Change	80_G	80_G	Change	90_I	90_I	Change	80_I	80_I	Change
	_FARRM	_base		_FARRM	_base		_FARRM	_base		_FARRM	_base		_FARRM	_base		_FARRM	_base	
Mean																		
2000	8,554	9,025	-5%	7,837	8,076	-3%	170	170	0%	0	0	-	28,050	30,591	-8%	13,668	15,694	-13%
2001	2,914	6,176	-53%	2,329	4,456	-48%	2,779	3,233	-14%	2,073	2,145	-3%	7,865	11,079	-29%	3,680	4,813	-24%
2002	5,968	9,092	-34%	4,428	7,650	-42%	5,371	8,129	-34%	2,491	4,915	-49%	12,816	15,344	-16%	5,597	7,600	-26%
2003	10,123	12,023	-16%	8,350	10,921	-24%	4,240	6,932	-39%	2,000	2,679	-25%	13,766	18,023	-24%	6,494	9,151	-29%
2004	5,782	10,252	-44%	4,888	8,804	-44%	2,221	3,884	-43%	1,133	1,348	-16%	3,037	6,069	-50%	1,133	1,348	-16%
Total	6,668	9,313	-28%	5,566	7,981	-30%	2,956	4,470	-34%	1,539	2,218	-31%	13,107	16,221	-19%	6,114	7,721	-21%
Number of Farms Experiencing Shortfalls (Shortfall >0)																		
2000	13	15	-13%	13	14	-7%	1	1	0%	0	0	-	20	20	0%	15	16	-6%
2001	8	14	-43%	7	14	-50%	2	4	-50%	2	2	0%	13	17	-24%	5	10	-50%
2002	10	12	-17%	7	11	-36%	7	10	-30%	4	7	-43%	14	17	-18%	9	10	-10%
2003	15	16	-6%	14	15	-7%	6	9	-33%	3	4	-25%	13	14	-7%	5	10	-50%
2004	10	17	-41%	10	13	-23%	4	9	-56%	1	2	-50%	7	14	-50%	1	2	-50%
Total	56	74	-24%	51	67	-24%	20	33	-39%	10	15	-33%	67	82	-18%	35	48	-27%
Standard Deviation																		
2000	18,401	18,384	0%	17,014	17,054	0%	931	931	0%	0	0	-	35,589	37,434	-5%	21,854	24,029	-9%
2001	6,376	9,118	-30%	5,270	7,370	-28%	14,506	14,714	-1%	11,023	11,183	-1%	22,090	22,758	-3%	17,579	17,565	0%
2002	15,264	16,965	-10%	13,647	15,320	-11%	14,448	18,606	-22%	8,668	12,261	-29%	21,792	22,894	-5%	12,807	14,549	-12%
2003	19,474	20,400	-5%	16,868	19,023	-11%	12,727	14,160	-10%	7,890	8,830	-11%	29,513	32,338	-9%	17,303	19,828	-13%
2004	11,863	16,330	-27%	10,420	14,698	-29%	9,575	10,562	-9%	6,203	6,275	-1%	10,245	11,896	-14%	6,203	6,275	-1%
Total	15,053	16,569	-9%	13,400	15,157	-12%	11,589	13,358	-13%	7,660	8,893	-14%	26,361	27,840	-5%	16,387	17,914	-9%



**Table 16. Continued.**

Maximum												
2000	87,206	87,206	79,691	79,691	5,102	5,102	-	-	130,564	145,723	83,987	99,146
2001	24,596	36,905	19,837	32,147	79,491	80,362	60,408	61,279	119,920	119,920	96,442	96,442
2002	76,266	76,266	71,779	71,779	66,878	73,473	44,504	51,099	69,365	73,473	46,991	51,098
2003	77,708	77,708	75,158	75,158	62,108	62,108	41,858	41,858	139,530	148,653	74,928	84,051
2004	41,436	54,715	38,783	50,263	52,234	52,234	33,977	33,977	52,234	52,234	33,977	33,977
Total	87,206	87,206	79,691	79,691	79,491	80,362	60,408	61,279	139,530	148,653	96,442	99,146

\* Scenario 90\_gross, 80\_gross, 90\_index, and 80\_index are abbreviated as 90\_G, 80\_G, 90\_I, and 80\_I

## Counter Cyclical Savings Accounts

Counter-cyclical (CC) savings accounts have been proposed as an alternative to FARRM accounts. Several features of the counter-cyclical savings account proposal differ from the FARRM account proposal. First, gross income is used to determine eligibility for CC accounts. Second, deposits to the account are matched up to the lesser of 2% of a gross income target or \$5,000. Third, the withdrawal of funds is limited to instances when gross income falls below a trigger point and can only be used to increase gross income to the trigger level.

The CC account proposal would utilize a tax-based measure of gross income for purposes of eligibility and determining the amount of the matching deposit from the government. The measure of gross income used in the analysis is defined as:

$$\begin{aligned} (16) \text{ gross income} &= \text{IRS Form 1040 Schedule F income} \\ &= \text{cash receipts from the sale of farm products} \end{aligned}$$

### *CC Accounts: Analysis of Gross Income Variability*

Since the CC proposal would base contributions and withdrawals on gross income, the variability in gross income will determine grower participation. The variation in gross income was assessed by examining the distribution of IRS Form 1040 Schedule F gross income (Table 17). The average gross income increased steadily over time. The relative variability in gross income is less than variability of net income. For the case of net income, the standard deviation was greater than the mean, while here the standard deviation is much less than the mean but sizable nonetheless. It is also useful to note that the correspondence between gross and net income is not perfect. For instance, net income fell substantially from 2003 to 2004 (27%), while gross income increased modestly at the same period.

**Table 17. Descriptive Statistics for Schedule F Gross Income by Year, 32 Grape Farms in Lake Erie Region.**

Year	Mean	Std. Dev	Minimum	Maximum
2000	\$152,973	\$97,492	\$12,709	\$401,831
2001	\$157,796	\$110,679	\$12,362	\$430,782
2002	\$159,527	\$121,766	\$12,537	\$537,476
2003	\$161,828	\$113,883	\$15,194	\$432,762
2004	\$176,779	\$139,871	\$11,595	\$546,251

### *CC Accounts: Eligibility and Participation Incentives*

The eligibility question is slightly different for the case of Counter-Cyclical accounts as opposed to FARRM accounts. Farmers can establish a farm counter-cyclical savings account as long as average gross income exceeds \$50,000 over the last five years. That is,

$$(17) \text{ Eligible in year } (1999+i), \text{ if } \frac{\sum_{j=i}^{i+4} (\text{gross income})_{1994+i}}{5} > \$50,000, i = 1, 2, 3, 4, 5$$

Five growers (15.6 % of the sample) were never eligible to make a contribution to CC accounts in the 5-year period. That is, 84.4 % of farms were eligible to establish CC accounts. Therefore, there are 27 farms included in the analysis of CC accounts. One farm was eligible to make a contribution on three occasions while the rest of farms (96.3%) were eligible to make a contribution up to 5 times (Table 18). Also, 100% of farmers were eligible to make contributions to the accounts from 2002-2004, while one farm was not eligible to make a contribution in 2000 and 2001 (Table 19).

**Table 18. Percent of Farms with Gross Income Enabling them to Contribute to CC Accounts, 27 Grape Farms in Lake Erie Region, 2000-2004.**

Number of Years Qualified to Contribute	% of Farms
1	-
2	-
3	3.7
4	-
5	96.3

**Table 19. Percent of Farms Eligible to Contribute to CC Accounts and Deposit Summary of CC Accounts per Year, 27 Grape Farms in Lake Erie Region.**

Year	Eligible	Deposit			
	% of Farms	Mean	Std. Dev.	Minimum	Maximum
2000	96.3	\$3,252	\$1,449	\$0	\$5,000
2001	96.3	\$3,237	\$1,545	\$0	\$5,000
2002	100	\$3,189	\$1,439	\$995	\$5,000
2003	100	\$3,252	\$1,377	\$1,334	\$5,000
2004	100	\$3,274	\$1,315	\$1,188	\$5,000
All Year	98.5	\$3,241	\$1,406	\$0	\$5,000

### Deposits to CC Accounts

Farmers are allowed to contribute any amount they desire to a CC account. The government would provide a matching deposit. However, the matching deposit would be limited to 2 % of gross income of the producer and could not exceed \$5,000 for any applicable year. Funds deposited to the account could earn interest at the market rate. Since earnings on these accounts are distributed and taxed annually, farmers have little incentive to put money in CC accounts that is not matched by the government. The funds could be invested in other accounts with fewer restrictions on withdrawal. In the analysis that follows, it is assumed that farmers will only contribute enough funds to maximize the potential government matching deposit. Specifically, the deposit was defined according to (18).

$$(18) \text{ deposit}_i = \text{Min} [0.02(\text{gross income})_i, 5000] \text{ in any given year } i$$

Table 19 presents the average deposits. These deposits can also be interpreted as the average government matching costs. The farms were able to contribute approximately \$3,200 per year. The amounts of average contribution did not vary considerably over time. The average contribution allows one to determine the extent to which the farmer was able to take full advantage of the maximum government matching deposit of \$5,000. As analyzed, growers with the financial means or cash flow who wished to contribute the full \$5,000 were only allowed to do so if the applicable gross income measure was at least \$250,000. Growers with less gross income were only allowed to contribute 2% of their gross income. The analysis shows that on average, 21% of farms in the entire period could contribute \$5,000 to take full advantage of the maximum government matching deposit.

### Participation Incentives

Counter-Cyclical accounts do not rely upon tax incentives and do not provide interest rate bonuses to encourage grower participation. The government's promise to match deposits provides the economic incentive for contribution to a CC account. Once deposited to the CC account, funds could be withdrawn only if gross income for the current year dropped below the income target. The amount that could be withdrawn from the account is limited to the amount needed to increase current gross income up to the income target.

Restrictions on access to the funds would most likely make growers contribute only enough funds to be eligible for the full government matching deposit. Although the return to a dollar eligible for matching and deposited in the account is 100% (through the matching government deposit), in the cases of short cash flows, the restriction on withdrawal would make growers deposit less than the estimates in Table 19. Specifically, this is a serious concern for farms that are experiencing growth in revenues over time. If these funds cannot be accessed in times of need they are likely less valuable to the farmer.

### *CC Accounts: Withdrawals and Benefits*

Unlike FARRM accounts, the funds deposited in a CC account cannot be withdrawn at the producer's discretion. Instead, the funds can only be withdrawn when gross income falls below 80 % or 90% level of income target. The analysis in the section and next section focuses on estimating how frequently farmers can withdraw funds from CC accounts under two measures income target levels, how many dollars they would need to withdraw in order to increase their income to the target level, and how many dollars they have available in the CC accounts.

Before presenting the results it is useful to present the assumptions and methods used to calculate the need for withdrawals and actual withdrawals. First, the analysis presented assumes that farmers can make a deposit and withdrawal in the same period. In other words, the farmer could place a deposit in the account to be matched in the current year. If the current year income is less than 80% or 90% of the target, the farmer could also withdraw enough funds from the account to increase income to the 80% or 90% level. The matching government contribution makes it attractive for farmers to contribute and withdraw in the same year. The need for funds to be withdrawn from the accounts is given by (19).

$$(19) \text{ need}_i = \text{Max} \left[ (\phi * \text{target}_i - \text{gross income}_i), 0 \right], \quad \phi = 0.9 \text{ or } 0.8$$

where *target* is the income target generated by one of the measures defined by equations (20)-(22). The measure of income target in equation (20) was defined to represent a 5-year rolling average of gross income.

$$(20) \text{ target}_{1999+j} = \frac{\sum_{i=j}^{4+j} \text{gross income}_{1994+i}}{5} \quad j = 1, 2, 3, 4, 5$$

To recognize the growth of farm business, using the five-year rolling average income as the income target might not represent the most recent gross income and therefore understate growers' effective need. As with the FARRM account case the indexing procedure used with the Adjusted Gross Revenue (AGR) Crop Insurance Program was used to index gross income<sup>3</sup>. This indexed income target is calculated according to the procedure described in the FARRM account section (page 24).

Withdrawals in any period are chosen to satisfy the need for income given that the most that can be withdrawn is the sum of the previous periods balance and the total deposits (government and farmer) in the current period (21).

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<sup>3</sup> A description of AGR and the income indexing procedure can be found on the USDA, Risk Management Agency website, RMA (<http://www.rma.usda.gov/>) or is available from the authors.

$$(21) withdrawal_i = \begin{cases} Min[need_i, balance_{i-1} + 2 * deposit_i] & , \text{ if } need_i > 0 \\ 0 & , \text{ otherwise} \end{cases}$$

Finally, the balance in the account at the end of each period is determined by (22).

$$(22) balance_i = balance_{i-1} + 2 * deposit_i - withdrawal_i$$

Regarding certain design parameters for the effective CC programs, the measures of income target were constructed for both gross income and indexed gross income. Two measures of income target plus another parameter,  $\phi$  in equation (19) assumed equal to 0.9 or 0.8 to represent the level of income target, provide the four scenarios for the analysis of CC accounts. Four scenarios can be denoted as 90\_gross ( $\phi = .9$ , *target*), 80\_gross ( $\phi = .8$ , *target*), 90\_index ( $\phi = 0.9$ , *index target*), and 80\_index ( $\phi = .8$ , *index target*).

### Results of Withdrawals and Benefits

We first examine how frequently growers would be eligible to withdraw deposited funds from the account. An indicator variable was created for each of the four scenarios. This variable was recorded as a one if the farmer would be eligible to withdraw funds from the account and a zero otherwise. The analysis shows that the frequencies eligible to withdraw funds depends critically on the measures of income target and  $\phi$  used to calculate the need.

Table 20 shows the percent of growers eligible to withdraw funds from the CC accounts by year. Table 21 shows how frequently individual farms were eligible to withdraw from the accounts over the five-year period. Since the 90% income target is higher than the 80% income target, growers would have the opportunity to withdraw funds more frequently under the scenarios with a 90% target.

**Table 20. Percent of Farms Eligible to Withdraw Funds from CC Accounts in Various Years, 27 Grape Farms in Lake Erie Region.**

Year	Withdrawal Scenarios			
	90_gross	80_gross	90_index	80_index
2000	3.7	0.0	63.0	51.9
2001	7.4	3.7	48.1	25.9
2002	29.6	22.2	55.6	33.3
2003	33.3	14.8	51.9	37.0
2004	25.9	3.7	44.4	3.7
Entire Period	20.0	8.9	52.6	30.4

**Table 21. Number of Times that Farms are Eligible to Withdraw Funds from CC Accounts, 27 Grape Farms in Lake Erie Region, 2000-2004.**

Number of years eligible to withdrawing funds	Withdrawal Scenarios			
	90_gross	80_gross	90_index	80_index
	-----Percent of Farms-----			
0 yr	44.4	63.0	-	14.8
1 yr	22.2	33.3	22.2	33.3
2 yrs	22.2	-	14.8	40.7
3 yrs	11.1	3.7	48.1	7.4
4 yrs	-	-	7.4	3.7
5 yrs	-	-	7.4	-

Using an indexed gross income trigger increased the likelihood of withdrawals from the accounts. For instance, the 90\_index and 80\_index scenarios produced frequencies eligible to withdraw funds more than 2 times higher than those in the scenarios 90\_gross and 80\_gross (Table 20). Also, the indexed targets substantially reduced the number of growers that were unable to make withdrawals from the accounts (Table 21).

The average withdrawals in the scenario 90\_index and 80\_index are around 2 times greater than those in the scenarios 90\_gross and 80\_gross (Table 22). The average withdrawal for the entire period in the scenario 90\_index, \$4,486 was even higher than the average deposit for the entire period, \$3,241 meaning that the farms would be able to withdraw some of the government's matching deposits (Table 19 & 22).

When one considers the average final balances remaining in the accounts it is obvious that most growers except those under scenario 90\_index are able to build sizable account balances over a 5- year period. This is understandable as there were few withdrawals

**Table 22. Average Withdrawals from CC Accounts, 27 Grape Farms in Lake Erie Region.**

Year	Withdrawal Scenarios			
	90_gross	80_gross	90_index	80_index
2000	\$189	\$0	\$4,381	\$3,386
2001	\$822	\$440	\$3,036	\$1,536
2002	\$3,486	\$3,073	\$4,623	\$3,400
2003	\$4,498	\$1,338	\$6,584	\$5,226
2004	\$2,084	\$166	\$3,807	\$166
Entire Period	\$2,216	\$1,003	\$4,486	\$2,743

from the accounts. Furthermore, in the scenarios of 90\_gross and 80\_gross, there were several farms that did not withdraw any funds from the accounts and built balances up to \$50,000 that reflected the maximum contributions and government matches (Table 23).

**Table 23. Summary of Final Balances in CC Accounts, 27 Grape Farms in Lake Erie Region.**

Balance Scenarios	Mean	Median	Std. Dev.	Maximum	Minimum
90_gross	\$21,330	\$17,084	\$17,856	\$50,000	\$0
80_gross	\$27,392	\$22,877	\$16,748	\$50,000	\$0
90_index	\$9,978	\$7,702	\$9,905	\$40,000	\$0
80_index	\$18,695	\$15,950	\$13,662	\$49,411	\$0

### *CC Accounts: Income Shortfalls and Stabilization*

While some farms could build positive account balances, a significant number of farms that experienced a drop in income would not have a large enough balance to return income to the target level. To examine if growers build sufficient account balances to insure against variability in farm income, we first calculate the amount of shortfall for CC accounts, which is defined by (23).

$$(23) \text{ shortfall}_i = \text{need}_i - \text{balance}_{i-1} + 2 * \text{deposit}_i, \text{ if } \text{need}_i > 0 \text{ and } \text{shortfall}_i > 0 \\ = 0, \text{ otherwise}$$

As with the case of FARRM accounts, the shortfall reflects the situation where the balance in the account is insufficient to allow the grower to increase income to the target level. An indicator variable was created to count the frequencies of the shortfall (zero balance) for each of the four scenarios. This variable was recorded as a one if the shortfall is greater than zero and a zero otherwise.

Table 24 shows that the percent of growers with shortfall for each year of the study. The frequencies of shortfall under the four scenarios are highly correlated with the frequencies eligible to withdraw funds from CC accounts shown in Table 20. Using indexing gross income as withdrawal trigger would significantly increase the frequencies of shortfalls as well as the frequencies of withdrawal. The frequencies of the shortfall in the scenarios of 90\_gross and 80\_gross are substantially less than the scenarios of 90\_index and 80\_index.

Over the entire period 41.5% of times growers in the scenario 90\_index had shortfalls for, while only 10.4% of growers in the scenario 90\_gross experienced a shortfall. Table 25 shows the conditional average shortfall calculated as  $E[\text{shortfall}_i | \text{shortfall}_i > 0]$ , which indicates the average amount of insufficient funds after withdrawing from the accounts when a shortfall occurs. The average shortfalls over the entire period range from \$22,965



**Table 24. Percent of Farms Experiencing Shortfall, 27 Grape Farms in Lake Erie Region.**

Year	Shortfall Scenarios			
	90_gross	80_gross	90_index	80_index
2000	-	-	63.0	40.7
2001	3.7	3.7	40.7	11.1
2002	22.2	14.8	40.7	22.2
2003	14.8	7.4	44.4	18.5
2004	11.1	3.7	18.5	3.7
Entire period	10.4	5.9	41.5	19.3

**Table 25. Average Annual Shortfall, 27 Grape Farms in Lake Erie Region.**

Year	Shortfall Scenarios			
	90_gross	80_gross	90_index	80_index
2000	-	-	\$46,080	\$33,883
2001	\$68,477	\$49,395	\$21,046	\$30,722
2002	\$23,574	\$15,142	\$29,742	\$22,049
2003	\$21,623	\$22,129	\$30,244	\$26,683
2004	\$16,493	\$29,494	\$13,693	\$29,494
Entire period	\$24,707	\$22,965	\$31,668	\$29,234

(scenario 80\_gross) to \$31,668 (scenarios 90\_index). The conditional average shortfalls vary by year as well as by the scenarios because large amounts of shortfall occurred for some of individual farms in a year or in a scenario. For example, the scenarios of 90\_gross and 80\_gross had one grower (3.7%) experiencing the shortfall in 2001, but this grower also caused the highest average shortfalls, \$68,477 in scenario 90\_gross and \$49,395 in the scenario 80\_gross across the four scenarios during the entire period.

To examine the impact of the CC accounts on the stabilization of grower incomes, we estimate and compare the shortfall with and without CC accounts under the four scenarios. The amount of shortfall with the existence of a CC account has been defined as (23). We assume that without a CC account, farmers would experience shortfalls when gross income is less than 80% level or 90% level of the target. That is, the need defined as (19) is greater than zero when a shortfall occurs. The amount of shortfall without the existence of a CC account is defined as (24).

$$(24) \text{ Shortfall\_base}_i = \text{need}_i, \text{ if } \text{need}_i > 0 \\ = 0, \text{ otherwise}$$

Table 26 shows the average shortfall, number of farms experiencing shortfalls (shortfall >0), standard deviation of shortfall, and the maximum shortfall with and without the existence of CC accounts. To compare the shortfalls with and without CC accounts, we calculate the change of the average shortfall, standard deviation of shortfall, and number

**Table 26. Summary of the Shortfall with and without CC Accounts, 27 Grape Farms in Lake Erie Region, Continued.**

Year	Shortfall Scenarios with / without FARRM Accounts											
	90_gross	90_gross	Change	80_gross	80_gross	Change	90_Index	90_Index	Change	80_Index	80_Index	Change
	_cc	_base		_cc	_base		_cc	_base		_cc	_base	
Mean												
2000	-	\$189	-100	-	-	-	\$29,013	\$33,394	-13	\$13,804	\$17,191	-20
2001	\$2,536	\$3,358	-24	\$1,829	\$2,270	-19	\$8,574	\$11,611	-26	\$3,414	\$4,950	-31
2002	\$5,239	\$8,724	-40	\$2,243	\$5,317	-58	\$12,117	\$16,740	-28	\$4,900	\$8,299	-41
2003	\$3,203	\$7,702	-58	\$1,639	\$2,977	-45	\$13,442	\$20,026	-33	\$4,941	\$10,168	-51
2004	\$1,833	\$3,917	-53	\$1,092	\$1,258	-13	\$2,536	\$6,343	-60	\$1,092	\$1,258	-13
Total	\$2,562	\$4,778	-46	\$1,361	\$2,364	-42	\$13,136	\$17,623	-25	\$5,630	\$8,373	-33
Number of Farms Experiencing Shortfalls (Shortfall >0)												
2000	-	1	-100	-	-	-	17	17	0	11	14	-21
2001	1	2	-50	1	1	0	11	14	-21	3	8	-63
2002	6	8	-25	4	6	-33	11	15	-27	6	9	-33
2003	4	9	-56	2	4	-50	12	14	-14	5	10	-50
2004	3	7	-57	1	1	0	5	12	-58	1	1	0
Total	14	27	-48	8	12	-33	56	72	-22	26	42	-38
Standard Deviation												
2000	-	\$982	-100	-	-	-	\$35,369	\$38,481	-8	\$21,867	\$24,909	-12
2001	\$13,178	\$15,516	-15	\$9,506	\$11,793	-19	\$22,655	\$23,941	-5	\$16,633	\$18,514	-10
2002	\$12,799	\$19,525	-34	\$6,445	\$12,869	-50	\$20,804	\$23,731	-12	\$10,385	\$15,186	-32
2003	\$11,466	\$14,747	-22	\$7,212	\$9,276	-22	\$24,952	\$33,538	-26	\$12,547	\$20,683	-39
2004	\$9,181	\$11,045	-17	\$5,676	\$6,539	-13	\$9,588	\$12,436	-23	\$5,676	\$6,539	-13
Total	\$10,503	\$14,014	-25	\$6,522	\$9,344	-30	\$25,353	\$28,990	-13	\$14,933	\$18,757	-20

**Table 26. Continued.**

Maximum								
<b>2000</b>		\$5,102			\$135,723	\$145,723	\$89,146	\$99,146
<b>2001</b>	\$68,477	\$80,362	\$49,395	\$61,279	\$116,265	\$119,920	\$86,501	\$96,442
<b>2002</b>	\$51,161	\$73,473	\$28,787	\$51,099	\$62,300	\$73,473	\$34,210	\$51,098
<b>2003</b>	\$57,302	\$62,108	\$37,053	\$41,858	\$108,653	\$148,653	\$44,051	\$84,051
<b>2004</b>	\$47,751	\$52,234	\$29,494	\$33,977	\$47,751	\$52,234	\$29,494	\$33,977
<b>Total</b>	\$68,477	\$80,362	\$49,395	\$61,279	\$135,723	\$148,653	\$89,146	\$99,146

of farms experiencing shortfalls when the CC accounts exist. Those changes can be interpreted as the degrees of income stabilization. Under the four scenarios, the CC accounts reduced 25% to 46% of the average shortfall, 23% to 48% of number of farms experiencing shortfalls, and 13% to 30% of standard deviation of shortfall over the entire period.

## **Conclusions**

The research project evaluated two specific farm savings account proposals, counter-cyclical farm savings (CC) accounts and farm and ranch risk management (FARRM) accounts. Both proposals require that the farmer deposit funds into the account. Under the counter-cyclical savings accounts program, eligibility is based upon gross income, the government would match the farmer's deposit up to \$5,000, and farmers could withdraw when gross income fell below a specified trigger level. For FARRM accounts, eligibility to participate was based upon having positive net income and deposits were not matched, but rather were tax deferred. Withdrawals from the accounts were evaluated using various historical gross and net income trigger levels. The objectives of the study were to assess the ability of growers to contribute to the accounts, the ability of growers to withdraw funds from the accounts, and the ability of the accounts to reduce income variability.

The findings suggested that the eligibility rules for the proposed CC accounts are not restrictive as most farms would be eligible to make a contribution every year. The positive net income eligibility criterion for FARRM accounts is much more restrictive and will significantly reduce the number of farms eligible to contribute to savings accounts. Specifically, the study found that 90% of the farms would be eligible to contribute to CC accounts in all five years of the study. This is not surprising because eligibility only required 1040 Schedule F gross income in excess of \$50,000. Eligibility to make deposits to FARRM accounts was noticeably lower as this program required the farm to have positive 1040 Schedule F net income. In the case of FARRM accounts only 36% of the farms would be eligible to make deposits in all 5 years. However, all of the farms were eligible to contribute to FARRM accounts in at least one year and 87% were eligible to make deposits in three of the five years.

The study also examined the magnitude of deposits to the accounts. The average annual farmer contribution to CC accounts was \$3,042. Based on a maximum deposit rate of 2% of gross income, many of the specialty crop farms in this study were unable to take advantage of the full \$5,000 government match. In other words, many had sales less than \$250,000. The analysis shows that on average, 21% of farms in the entire period could contribute \$5,000 to take full advantage of the maximum government matching deposit. The average deposit over the period was \$3,042. With the government match this would result in an average annual deposit to the account of \$6,084.

Unlike CC accounts, where every contribution is matched up to \$5,000, many farms have little incentive to participate in FARRM accounts because the incentives are based completely on tax deferral. Based on farm income alone, nearly half of the farms are in 10% or lower marginal federal income tax bracket. There are two important financial incentives to encourage farmer participation in FARRM accounts. The most basic benefit is the deferral of tax liability for one

year or more. The ability to defer taxes to a tax year in which the farm is in a lower tax bracket would result in lower taxes, creating an incentive for contribution to a FARRM account. For instance, a farmer could contribute to a FARRM account in a year in which the income would be taxed at the 27% marginal tax bracket and then withdraw the funds in a year where they find themselves in a lower tax bracket. Second, the farmer is able to invest the deferred taxes, earning interest on the balances. The results of the study show that this benefit is quite small on average due to relatively small balances and low interest rates.

The marginal tax bracket plays a critical role in determining the value of FARRM accounts. Larger and more profitable farms will receive the greatest benefits from the FARRM account program because these farms are more likely to be in higher marginal tax brackets. The greatest benefit obtained from FARRM accounts occurs when farmers can contribute in years with a high tax liability and withdraw in years with a reduced tax liability. Although most farmers have a positive net income, many face a relatively low marginal tax rate. Based only on farm income, 24% would typically be found with a 0% marginal tax rate, meaning that they would owe no federal income tax, and 20% would find themselves in the 10% marginal tax bracket. This would significantly reduce their incentive for participation in the program. On the other hand 16% of the farms generated farm income that would place them in the 27% federal tax bracket. These farms would have a much greater incentive to participate in the program. This structure makes the program of much more value to large and profitable farms.

Farms were allowed to place up to 20% of 1040 Schedule F Net farm income into FARRM accounts, without regard to their current tax bracket. Under this assumption, the average FARRM account deposit was \$4,526. When the government match is considered, the average CC account balance was larger than the average FARRM account balance. However, as modeled, the FARRM account balances are more variable and large farms are able to place considerably more funds in FARRM accounts than in CC accounts. The average amount of funds deposited by the farmer was greater under FARRM accounts than for CC accounts. Here, the average annual deposit was \$4,526. Because the farmer's deposit was not matched, the total amount placed in the account was generally lower for FARRM accounts than for CC accounts.

While the FARRM account proposal allows farmers to make withdrawals at their discretion, the CC account proposal places conditions on when the farmer can make a withdrawal. These withdrawal provisions on the accounts are critical. If withdrawal triggers are not indexed to allow for growth, few farms will be able to make withdrawals. Restrictive withdrawal rules will significantly reduce the appeal of the accounts as a risk management tool. The results of the study indicate that this is a critical feature of the CC program. Higher gross income withdrawal triggers increase the likelihood that a farm can make a withdrawal. For instance, an 80% gross income trigger would typically allow 8% of the farms to make a withdrawal in a given year and a 90% trigger would allow 20% to make a withdrawal. Additionally, indexing the gross income trigger to adjust for changes in farm size allows more farms to make withdrawals. Here, 30% of the farms would be able to make a withdrawal under an 80% indexed gross income trigger and 52% would be able to make a withdrawal under a 90% indexed gross income trigger.

The analysis of the FARRM account program included a comparison of withdrawals under both gross and net income triggers. The use of a net income trigger versus a gross income trigger does not appear to significantly alter the likelihood of making a withdrawal. As a result, a gross income trigger is likely preferred because it is more easily indexed than a net income trigger. When a 90% indexed gross income trigger was used, slightly over half the farms were able to make a withdrawal. A 90% net income trigger resulted in 48% of the farms being able to make a withdrawal.

The ability of the accounts to manage income variability was assessed by comparing the amount by which income fell short of the gross or net income trigger level with and without the accounts. Farm savings accounts show some promise in addressing income variability, but restrictions on the size of the deposits limits their ability to completely mitigate income variability. Many farms will still experience considerable income variability. The accounts also appear unable to handle back-to-back adverse financial outcomes.

While some farms could build positive account balances over the 5 years of the study, a significant number of farms that experienced a drop in income sufficient to trigger a withdrawal did not have a large enough account balance to resolve their income shortfall. Under a 90% indexed income withdrawal trigger, nearly 40% of the farms would be unable to completely manage their income shortfall with the CC savings account. Additionally, the resulting zero balance in the savings account would leave these growers with little financial protection for the next year. Still, the CC accounts reduced the typical shortfall from the income trigger by 25 to 46%, which shows considerable promise in managing income risk. Similar results were found for the FARRM accounts, although the reduction in income was slightly smaller due to smaller account balances.

Although many farms did not have sufficient funds to manage their income risk, many finished the five year study period with positive account balances. Including the government match, the average ending balance in the CC accounts with a 90% indexed income withdrawal trigger was \$9,425. The ending balance in the FARRM accounts with a 90% indexed gross income withdrawal trigger was \$7,199.

While the savings accounts were able to reduce income variability, the funds in the accounts were often insufficient to completely mitigate income variability. Unless larger subsidies are offered, savings account programs are unlikely to provide a complete risk management solution for specialty crop growers. Additionally, for widest appeal the program should combine both government deposit matching and tax deferral of deposits.

While the tax deferral benefits of the FARRM account will appeal to high income farms, the relatively small amount government matching for CC accounts will provide little income protection for larger farms. The most useful program would likely combine both tax deferral and government matching of deposits. This would broaden the appeal of the accounts and make them a more viable risk management tool for larger farms.

The accounts will provide little protection in successive low-income years. This is a critical concern because agriculture often undergoes multiple year price cycles. In this situation additional emergency government deposits to the accounts would likely be necessary to reduce income shortfalls. In fact, the juice grape industry experienced three consecutive years of declining prices in 2002-2004, and although data are not available for 2005 it is unlikely that prices increased significantly. Finally, the analysis assumed that farmers would have the available cash flow to invest in the accounts. Unless the farmers postpone investment or use additional debt, many would be unable to fully fund the accounts. These concerns aside, the accounts show promise in providing a component of a comprehensive farm income safety net.

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# **Chapter 3**

## **Metropolitan Growth and the Specialty Crops Industries in the United States: Farming in the City's Shadow\***

by  
**Nelson Bills, Wen-fei Uva, and Mei- Luan Cheng\*\***

### **Introduction**

Agriculture is an integral part of urban growth and population change. This fact is frequently unrecognized by the general public, mainstream agricultural interests, and political leaders. In many people's minds, there is the perception of a rural – urban split that results in competition for resources and separate policies. A critical need exists to gain a better understanding for our current agricultural situation and to broaden the perception of agriculture beyond its traditional rural roots and commodity production focus. Recently, some studies have paid attention to agriculture's urban dimensions and illustrate the complex system of urban agriculture which encompasses the aspects of interests from a core of traditional production, processing, marketing, distribution, and consumption activities to more extensive system components including recreation and leisure, business entrepreneurship, environmental restoration and remediation, individual and community health and well-being, etc (Council for Agricultural Science and Technology, 2002). Today, agriculture is found in both rural and urban locations, but in differing forms and intensities. They are often in response to differing demands and opportunities.

Urbanization is one of the most important factors influencing agriculture, and many believe that it often has negative impacts on agricultural production. As the United States continues to urbanize, the conflicts between agricultural and nonagricultural use of land may intensify. Some researchers have reported that urban growth results in farm operators' disinvestment in their agricultural operation in anticipation of their land being converted from farm to urban use. Others suggest that there are some positive adjustment strategies that farm operators can adopt which take advantage of the market potential of being near large number of population.

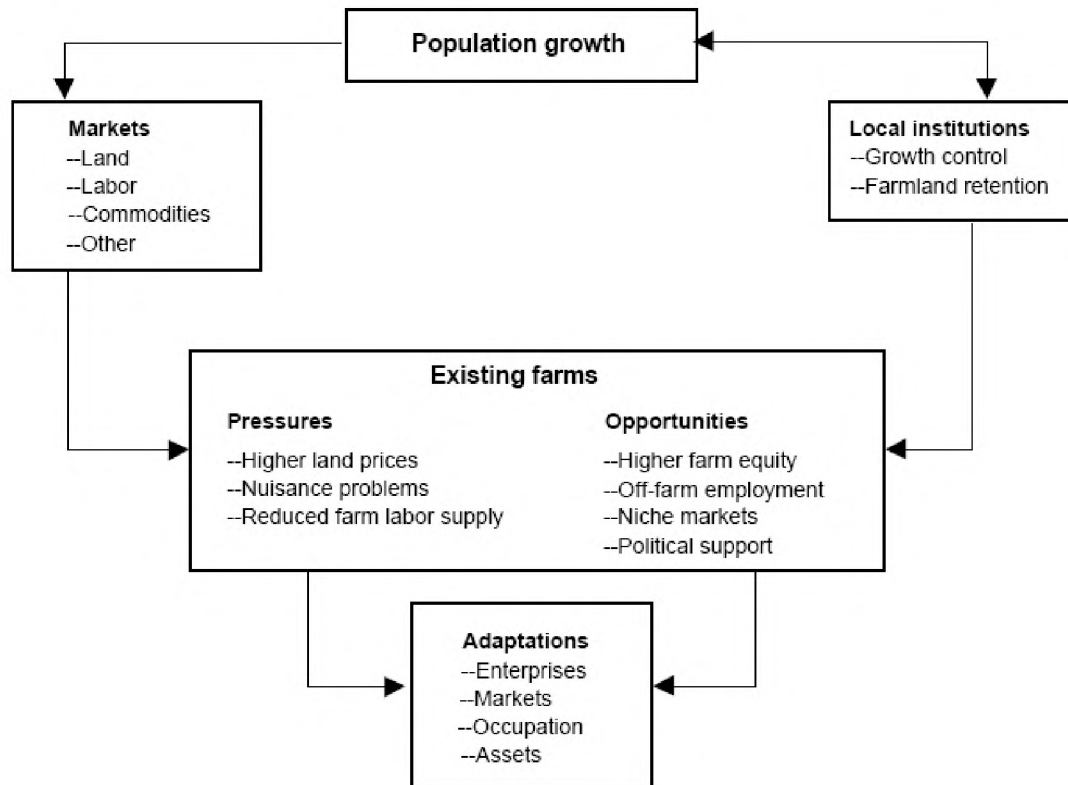
We argue that urban influences have both negative and positive aspects, which simultaneously bring pressure on farmers to adapt and offer them opportunities. A number of descriptive reports have shown national trends of agricultural change which reveal both impermanence and opportunities. Heimlich and Brooks (1989) found that farms in metro areas nation-wide produce more than two-thirds of the farm sales in fruit and vegetables and more than three-fourths of nursery and greenhouse sales. Hines and Rhodes (1994) indicated that a higher proportion of agriculture sales in U.S. metropolitan areas came from high value production, such as dairy and nurseries, while a higher proportion of agriculture sales in nonmetropolitan areas came from lower value production, such as grain, cattle and calves. Also, other studies indicated that metropolitan counties produced more than other counties in total crop sales for fruit, vegetables and nursery and greenhouse products in each of the five censuses from 1978-1997. Except in the central Great Plains, much of U.S agriculture occurs in counties defined as "urban influenced"

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(within metropolitan counties or adjacent counties). These areas contain much of the nation's most productive agriculture and grow most of the specialty food: 79% of U.S fruits, 68% of vegetables, and 52% of dairy products are produced in urban-influenced counties (CAST report, 2002). The following conceptual model helps discuss the adaptation of agriculture to the forces of urbanization (Heimlich and Brooks, 1989).



Metro farm characterizations in earlier studies were based on aggregated county statistics. In seeking better understanding of high-value agricultural production in metropolitan areas, this study assesses distribution of the specialty crops production in the urbanizing areas in the U.S. in order to answer questions such as “Does specialty crops production still thrive in the metro areas?” or “Does farming persist in the city’s shadow?” From the literature reviews, we assume that production of the specialty crops has been highly concentrated in the metropolitan areas over time.

## Methods and Data

### *Measuring Urban Settlement*

In 2003, the federal Office of Management and Budget (OMB) released the Census 2000 version of metropolitan (metro) and nonmetropolitan (nonmetro) areas. This classification system is commonly used to differentiate urban and rural settlement in the United States. The update classifies nearly 300 formerly nonmetro counties as metro while 45 metro counties were reclassified as nonmetro. The new set of nonmetro counties have significantly fewer residents than the former (1993) set based on the 1990 census.

These reclassifications reflect not only urban growth and shifts in residential choices, but also modification of the rules governing metro and nonmetro status. OMB made far-reaching changes to simplify criteria and add a new micropolitan area classification. The new category subdivides previously undifferentiated nonmetro territory into two distinct types of counties—micropolitan and noncore. The former contains settled urban territory (urban core) with a population below the metropolitan classification threshold.

Metro areas were previously defined to include central counties with one or more cities of at least 50,000 residents or with an urbanized area of 50,000 or more and total area population of at least 100,000. Outlying counties were included if they were both economically tied to the central counties, as measured by daily commuting, and they displayed a level of "metropolitan character" based on population density, urbanization, and population growth. A county with high "metropolitan character" would be included with as little as 15% of its workers commuting. A county low in such attributes would be regarded as nonmetro no matter how high the commuting linkage was to the central county or counties.

Under the new "core-based statistical area" system, metro areas are defined for all urbanized areas regardless of total area population. In addition, inclusion as an outlying county is based on a single commuting threshold of 25% with no "metropolitan character" requirement. The addition of new metro areas reflects actual population growth during the 1990s that exceeded the 50,000 urbanized area threshold. The addition of formerly nonmetro counties to the fringe of existing metro areas comes partly from suburbanization and partly from rule changes, most notably the removal of a "metropolitan character" requirement. The reclassification of 45 metro counties to nonmetro status traces to OMB rule changes.

Metropolitan designations are an integral component of the geography employed by the US Census Bureau to identify and describe urban and rural places. A summary is provided in Figure 11.

**Figure 11. Key definitions for rural and urban in federal statistics**

***Metropolitan/Nonmetropolitan*** - One or more counties (except in New England, where towns are used) containing a large urban core with a population and adjacent communities that have a high degree of economic and social integration with that core. They are defined in terms of entire counties (except in New England, where towns are used).

***Urban/Rural*** - Census urban is all territory, population, and housing units located in urbanized areas (UAs), an urban cluster (UC) and in places of 2,500 or more inhabitants outside of UAs.

***Urbanized Areas (UAs)*** - A UA is a continuously built-up area with a population of 50,000 or more, comprised of one or more places—*central place(s)*—and adjacent densely settled surrounding area—*urban fringe*—consisting of other places and nonplace territory.

***Urban clusters (UC)*** - Census blocks *with population densities of 500 persons per square mile or more.*

***Urban Places Outside of UAs*** - Outside of UAs, an urban place is any incorporated place or census designated place (CDP) with at least 2,500 inhabitants.

***Rural Places and Territory*** - Territory, population, and housing units that the Census Bureau does not classify as urban are classified as *rural*.

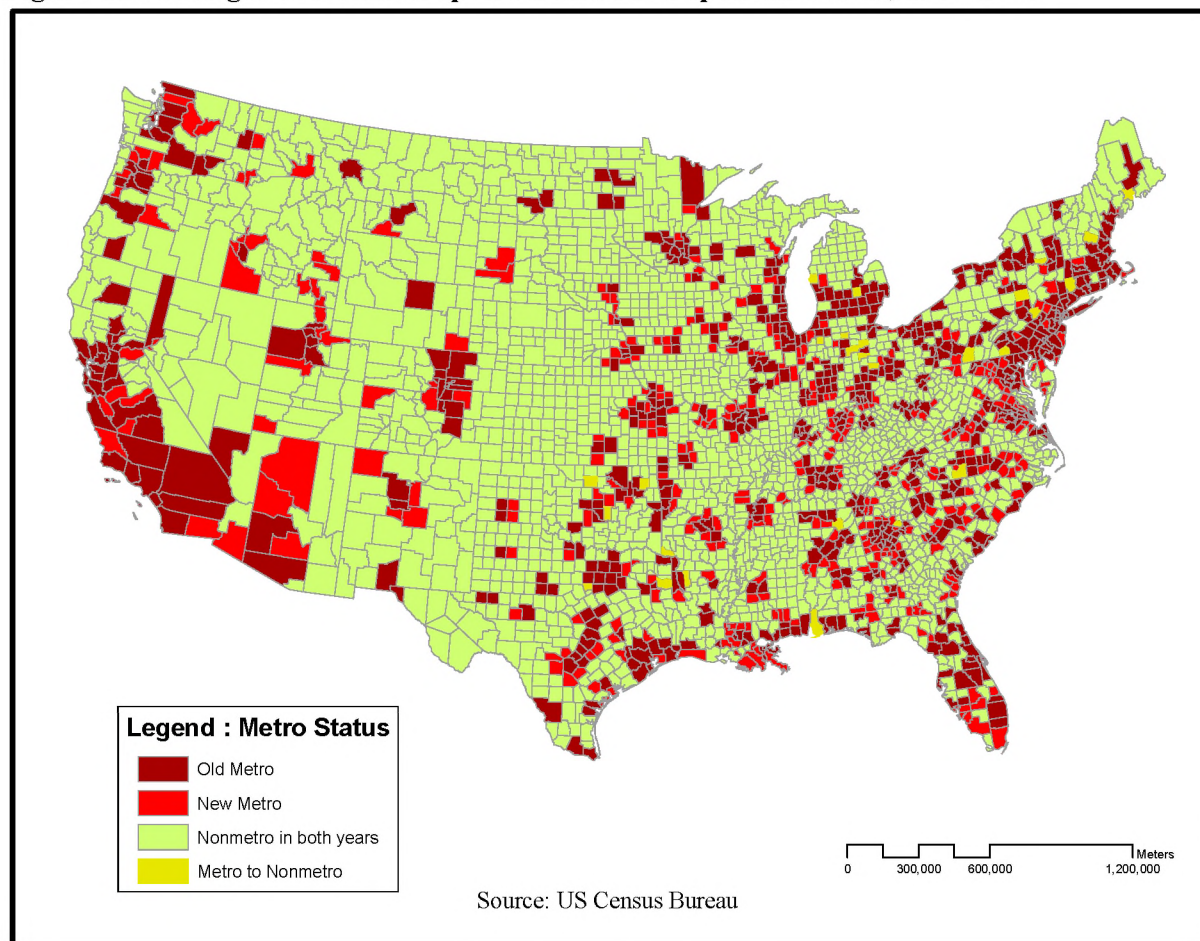
***Places*** - A *place* is a concentration of population that may or may not have legally prescribed limits, powers, or functions of government. This concentration of population must have a name, be locally recognized, and not be part of any other place.

Source: US Census Bureau, 2006c.

### Identifying Metro Counties for Study

For this study, a total of 3,069 counties reported in the five-year Census of Agriculture are classified into four groups of metro status: old metro, new metro, nonmetro in both years, and metro to nonmetro to reflect urban growth and restructuring over the past two decades (Figure 12). The group of old metro is comprised of 675 counties defined as metro in both 1980 and 2003. The group of new metro includes 381 new metro counties which were reclassified and received metropolitan status between 1980 and 2003. The current metropolitan area contains about 25% of U.S land area and 80% of the U.S. population. The nonmetro area has a total of 2,013 counties. The group of nonmetro in both years includes those counties defined as nonmetro in both 1980 and 2003. The group of metro to nonmetro includes 29 counties which were metropolitan in 1980 but reclassified as nonmetropolitan in 2003.

**Figure 12: Changes in Nonmetropolitan and Metropolitan Status, 1980-2003**



Our data set contains fewer counties than those reported by the Census Bureau for two reasons. First, we decided to confine our analysis to the contiguous 48 states and exclude Alaska and Hawaii. Secondly, we eliminated several cities (predominantly independent cities reported for the state of Virginia) counted as county units by the Census Bureau because they were not covered in the 1992 and 2002 Censuses of Agriculture.

### ***A Working Definition of Specialty Crops***

There is no single, widely agreed-upon definition of specialty crops. A broad definition, indeed the broadest, would extend to all farm commodities not designated as a “program crop” under the commodity titles of the federal Farm Bill. Such a broad definition may not be tractable for purposes of analysis and program administration. For this reason, other definitions are presently enshrined in federal law. Perhaps the most important example is the Specialty Crops Competitiveness Act of 2004 (Public Law 108-465; 118 STAT 3883) which defines the term

specialty crop somewhat narrowly to mean fruits and vegetables, tree nuts, dried fruits, and nursery crops (including floriculture). For our purposes in this study, we seek a middle ground and, while stopping well short of using an exhaustive list of non-program crops, choose to use a more expansive definition than the one specified in this Act. Our definition allows us to address key features of specialty crop production in the Northeast. Specialty crops in this project include fruit, vegetable, floriculture, nursery, maple syrup, live Christmas trees, sod, aquaculture, honey, and mushroom enterprises.

This definition fits well with the conventional wisdom on agriculture in the Northeast and seems well tailored to issues that specialty crop interests in the region want to pursue under the 2007 Farm Bill. In this chapter, however, we also have a number of practical considerations as we deal with the question empirically. Our focus is on specialty crop data reported at county level. Such data are only available on a geographically consistent basis from the 5-year Census of Agriculture.

Several data issues hindered our effort. One of the most significant relates to revised procedures for counting farms in the most recent 2002 Census. The USDA advises that these changes relate to efforts to acknowledge and correct for under enumeration of farm businesses; under enumeration can stem from shortcomings in mailing lists and from nonresponse. Additionally, the USDA used revised procedures to account for acreage included in selected USDA conservation programs-most notably the Conservation Reserve Program (CRP). As a result of these changes, thousands of farms with “potential” for meeting the OMB sales threshold of \$1,000 in sales during the census year are embedded in the 2002 Census reports. Conversely, a very significant fraction of farms counted in the 2002 Census do not have sales that exceed the \$1000 sales threshold. These adjusted data are dramatically different, indeed dramatic enough to foreclose meaningful comparisons of farm numbers with data from earlier census years (1997 excepted because the USDA reports “adjusted” 1997 data to preserve some comparability).

The fallback position, considering the above, involves using the metric of dollar sales. However, the 2002 census procedures also raise complications with sales data. The USDA decided to recombine individual commodity groups in some cases when reporting sales detail at county level. A critical change for the purposes of this study is one key commodity: potatoes. The 2002 Census added the market value of potatoes and sweet potatoes into market value of the “vegetables and melons” category. In the earlier census years, enough data were available allow one to isolate the market value of vegetables and melons production. These changes very deleteriously affect data comparability for critical specialty crop commodities.

After coping with these data issues, the sectors of specialty crop sales for our study include the following categories:

- *Fruits*: including fruits, tree nuts and berries.
- *Vegetables*: including vegetables and melons, and also including potato and sweet potato in 2002 only.
- *Nursery and Greenhouse Crops*: including bedding plants, bulbs, cut flowers, flower seeds, foliage plants, mushrooms, nursery potted plants, nursery stock, live Christmas tree, tobacco transplants, sod, etc., but excluding vegetable seeds in 2002.

We combine the statistical analysis with the mapping tools of Geographic Information System (GIS) to investigate the relationship between metropolitan growth and the specialty crops production. The sales shares of specialty crops are summarized by three groups of metro status on the national and regional scale. In addition, the ArcView GIS software package – ESRI – is used to display both urban influence and value of sales of specialty crops on the county –level U.S map.

## Results

### *National Overview: Agriculture and Urbanization*

In the past few decades, the U.S. has experienced a substantial spatial expansion of urban areas and a growth of population in these areas. As a result, an increasing number of farms are operating in communities under urban influence. Based on the re-definition of Metropolitan Statistical Areas (MSA's) designated by the Office of Management and Budget throughout the years, the number of counties included in MSA's increased 287% between 1950 to 2003 from 273 to 1,056 counties, and the metro land area increased three folds (303%) during the same period (Table 27). While the redefinitions did arbitrarily expand metro counties and population years to take into consideration the diffuse development pattern of urbanization, the population reside in the metro area at any given definition still increased 15 to 21% between 1990 and 2005. Urban development requires farm operators to adapt to increased competition for land as well as proximity to a growing number of non-farm residents.

Metro farms are generally smaller in land area, generate higher value per acre and more intensive farmland use than their counterparts located in nonmetro counties (Table 28). This trend becomes even more pronounced as counties have been metropolitan longer (the old metro counties). A general observation is that the need to generate higher value output on more expensive farmland in urbanizing areas leads farmers to operate more diverse enterprises and focus on higher value production. Growing population actually provides opportunities to grow new crops and market them in new ways. High-value crops, such as fresh fruit and vegetables, can be sold through specialized market niches such as restaurants and gourmet grocery outlets, or directly to consumers at road-side stands, farmers' markets, or U-pick. Land conversion to

**Table 27: Number of Counties, Land Area and Population of Metropolitan Statistical Areas (MSA), 1950-2005**

Metropolitan definition	MSA's	Land area	1990	Population 2000	2005
	<i>Number of counties</i>	<i>Sq.miles</i>		<i>- - - Million persons - - -</i>	
1950	273	213,876	138.5	153.2	159.0
1960	343	315,949	153.1	171.9	180.1
1971	462	395,030	166.2	187.9	197.7
1980	704	575,665	186.2	212.0	224.3
1990	729	589,430	189.6	216.1	228.9
2003	1,056	862,750	199.5	228.2	242.0

Source: Derived from Heimlich and Brooks; US Census Bureau, 2006a and 2006b.

**Table 28. Land in Farms and Use of Farmland by Metro Status, 2002**

Item	Unit	Metro			Nonmetro		
		<i>Old Metro</i>	<i>New Metro</i>	<i>Total</i>	<i>Nonmetro In both years</i>	<i>Metro to Nonmetro</i>	<i>Total</i>
Land in farms	Million acres	136	84	219	689	6	694
Number of farms	Thousand	598	273	871	1219	28	1247
Average farm size	Acres/ farm	227	306	252	565	199	557
Area in farms	Percent	38.1%	42.7%	39.7%	51.8%	47.1%	51.8%
Value of land and buildings	Dollars / acre	2,539	1,791	2,254	919	2,215	929
Value of ag. products sold	Dollars / acre	426	293	375	168	301	170
Use of farmland							
Harvested cropland	Percent	41.3%	36.4%	39.5%	30.7%	52.3%	30.9%
Other land in farms	Percent	58.7%	63.6%	60.5%	69.3%	47.7%	69.1%

housing, along with commercial and industrial uses, offers a market opportunity to nursery and greenhouse products. Based on the North American Industry Classification System (NAICS), 56% of vegetable farms, 73% of fruit farms, and 66% of nursery and greenhouse operations in the U.S. are located in metro counties, while the majority of other types of farming is located in nonmetro counties. Many farms are not only surviving; they are thriving in the metro regions. Metro counties had 24% of the nation's farmland, yet 41% of the farms are located in these counties.

The distribution of farm sizes is also different in metro and nonmetro counties, and between old and new metro counties (Table 29). Sixty-two % of metro farms are less than 100 acres in size, compared with 43% of non-metro farms. Again, this trend becomes more obvious as counties stay in metro status longer. Almost 66% of farms in old metro counties are less than 100 acres in size, compared with 55% of farms in metro counties added since 1980 (the new metro counties). Again the fact that metro areas support more small farms could be due to farmers' adaptation to higher value, more intensive production and part-time farming resulted in viable farming enterprises on a smaller acreage.

**Table 29. Distribution of Farms by Farm Size and Metro Status, 2002**

Farm size	Metro			Nonmetro		
	<i>Old Metro</i>	<i>New Metro</i>	<i>Total</i>	<i>Nonmetro In both years</i>	<i>Metro to Nonmetro</i>	<i>Total</i>
Acres	<i>Percent of farms</i>			<i>Percent of farms</i>		
1 to 9 acres	14.7%	8.6%	12.8%	5.1%	7.4%	5.1%
1 to 99 acres	65.8%	54.8%	62.4%	42.6%	56.9%	42.9%
260 or greater	15.9%	22.4%	17.9%	32.9%	19.5%	32.6%
2,000 or greater	1.6%	2.2%	1.7%	5.1%	0.9%	5.0%



### ***Specialty Crop Production in Metropolitan Areas***

The general characteristics of agricultural production in metropolitan areas are central to specialty crop sectors in US Agriculture. Table 30 shows that metro farms specialize in high-value crop production. A majority of specialty crop production sales are reported by metro farms, including 66% of vegetable sales, 83% of fruit sales, and 75% of nursery and greenhouse product sales in 2002. It should be noted that the 2002 Census of Agriculture included sales of potatoes and sweet potatoes in the vegetable sector, which is different from previous Census. If potato and sweet potato sales in the previous census could be excluded, the proportion of vegetable sales by metro farms would be even higher, as shown in the previous agricultural census (82% in 1982 and 79% in 1992). Potatoes are an important commodity of the U.S crop production, and the production is more concentrated in nonmetro areas. Western states produce two-thirds of the fall potato crop, with Idaho and Washington accounting for half of the U.S. total. Therefore, it is understandable that shares of total value of vegetable sales in metro areas are reduced somewhat when sales of potatoes are included.

Another agricultural production sector with sales conducted mainly by metro farms is horse, pony, mule, burro and donkey production (72%). Moreover, agriculture direct sales to consumers (65%) and certified organic production sales (50%) are also mainly by metro farms. These agriculture sectors tend to produce higher sales per acre than other agriculture enterprises (Table 30).

### ***Specialty Crop Production in the Metropolitan Areas by Region***

In this section, spatial sales data are presented by county for each specialty crop sector, along with a depiction of county metro status. In addition, shares of total sales of specialty crops are summarized by metro status across 10 agricultural production regions - Northeast, Lake, Corn Belt, Northern Plains, Appalachian, Southeast, Delta, Southern Plains, Mountain, and Pacific.

According to the 2002 Census of Agriculture, in terms of total production of vegetables, the top five States are California (37% of U.S total), Florida (7.9%), Washington (6.3%), Idaho (5.9%) and Arizona (5.9%). However, in 1997, the top five vegetable production states are California (53% of U.S total), Florida (6%), Arizona (4%), Washington (4%), and Wisconsin (4%). Changes in the ranking of top production States between 1997 and 2002 could be due to the effect of counting sales of potatoes and sweet potatoes in the vegetable sector in 2002 as explained in the previous section.

**Table 30. Value of Agriculture Products Sold by Metro Status in the U.S., 2002**

	Sales	Metro			Nonmetro			Missing Sales <sup>a</sup>
		<i>Old Metro</i>	<i>New Metro</i>	<i>Total</i>	<i>Nonmetro in both years</i>	<i>Metro to Nonmetro</i>	<i>Total</i>	
	<i>Bill. \$</i>							
					<i>-- Percent of total U.S. sales --</i>			
<b>Crops and nursery/greenhouse</b>	<b>94.69</b>	<b>38.7</b>	<b>11.8</b>	<b>50.5</b>	<b>47.0</b>	<b>0.7</b>	<b>47.7</b>	<b>1.9</b>
Grains, oilseeds, dry beans, and dry peas	39.94	17.2	9.6	26.8	66.3	0.9	67.1	6.1
tobacco	1.62	21.4	22.6	44.0	48.2	0.2	48.4	7.6
cotton	4.01	21.2	14.3	35.5	57.9	0.0	57.9	6.6
Vegetables	12.73	49.6	16.7	66.3	27.4	0.4	27.8	5.9
Fruits	13.44	69.4	13.5	83.0	13.9	0.4	14.3	2.7
Nursery and Geenhouse	14.56	68.3	6.9	75.2	13.2	0.9	14.0	10.8
Cut Christmas trees and short-rotation woody crops	0.38	33.5	9.7	43.2	39.7	1.2	40.9	15.8
Other crops	7.84	26.3	14.2	40.5	45.3	0.6	45.9	13.6
<b>Livestock, poultry, and their products</b>	<b>105.38</b>	<b>19.9</b>	<b>11.7</b>	<b>31.7</b>	<b>65.5</b>	<b>1.0</b>	<b>66.5</b>	<b>1.9</b>
Poultry and eggs	23.90	17.1	16.6	33.7	55.0	1.9	56.9	9.4
Cattle and calves	45.08	12.7	7.8	20.4	65.9	0.4	66.4	13.2
Milk and other dairy products from cows	20.16	36.6	12.6	49.2	44.1	1.2	45.3	5.5
Hogs and pigs	12.10	8.5	10.0	18.5	68.9	0.6	69.5	12.0
Sheep, goats, and their products	0.54	27.1	8.6	35.7	51.9	0.5	52.4	11.9
Horses, ponies, mules, burros, and donkeys	1.28	63.7	8.2	71.9	23.5	1.4	24.9	3.1
Aquaculture	1.10	16.4	12.0	28.4	45.2	0.1	45.4	26.3
Other animals and other animal products	0.70	24.3	6.4	30.7	22.3	0.4	22.7	46.6
<b>Agricultural products sold directly</b>	<b>0.80</b>	<b>53.2</b>	<b>11.9</b>	<b>65.1</b>	<b>29.8</b>	<b>1.4</b>	<b>31.2</b>	<b>3.7</b>
<b>Certified organically produced commodities</b>	<b>0.39</b>	<b>41.0</b>	<b>8.7</b>	<b>49.7</b>	<b>22.5</b>	<b>0.1</b>	<b>22.6</b>	<b>27.6</b>
<b>Total sales</b>	<b>200.07</b>	<b>28.9</b>	<b>12.2</b>	<b>41.2</b>	<b>58.0</b>	<b>0.8</b>	<b>58.8</b>	<b>0.0</b>

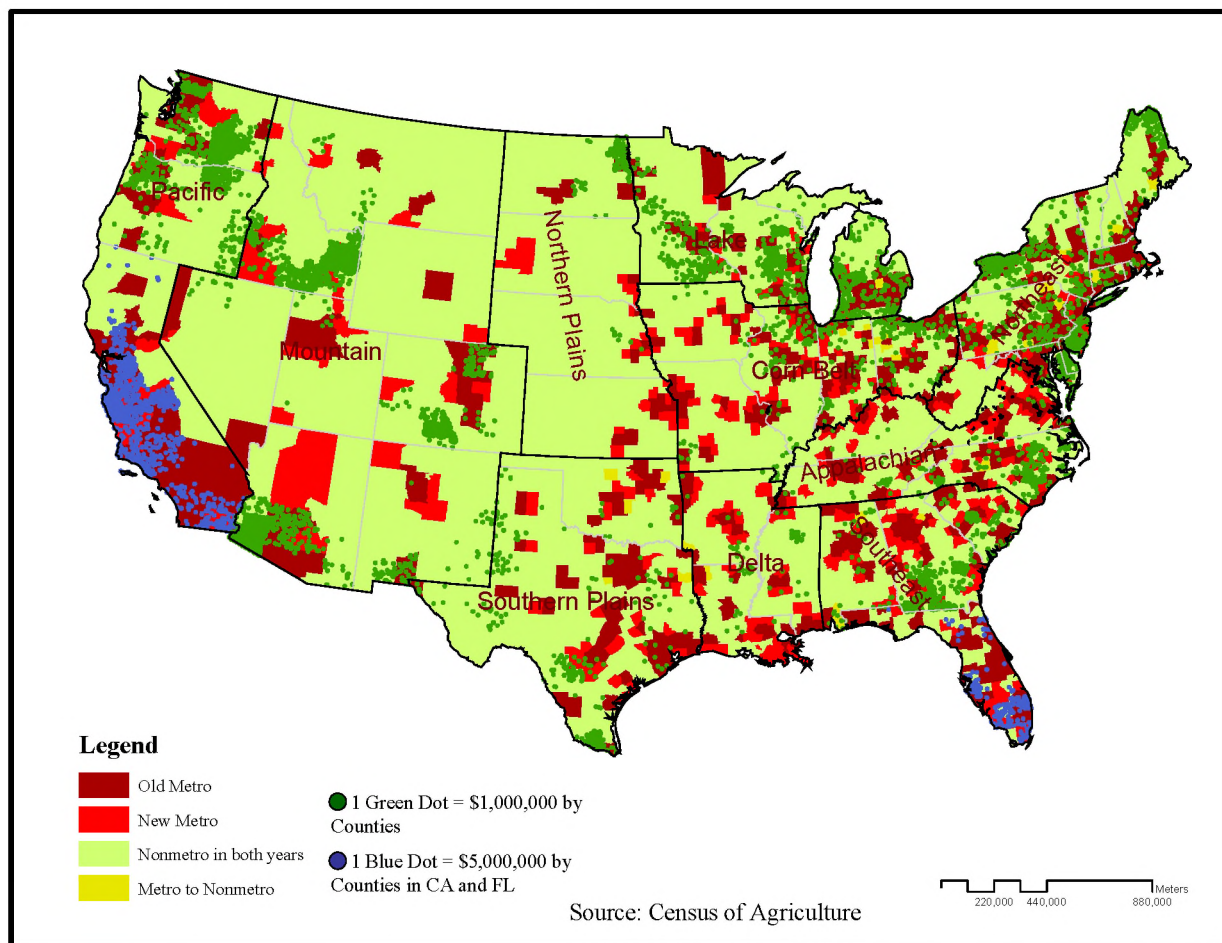
Figure 13 shows a map of vegetable production in 2002 in which one green dot represents one million dollars in sales and one blue dot, shown in California and Florida, five million dollars. Mapping at two different scales yields more insight on vegetable production. We observe that nonmetro counties might produce more vegetable sales than metro counties in the Lake and Delta regions. In addition, the production by metro status across regions is not homogeneously like the national trend which indicates 66.3% of total production in the metro areas.

Vegetable sales by metro status across regions are summarized in Table 31. In the Northeast, Southeast, Mountain, and Pacific regions, metro areas produce more sales than nonmetro areas. In the Lake, Appalachian, and Delta regions, nonmetro counties produce more vegetable sales. For the rest of regions, we are not sure the status of production because of missing data.

In the case of fruit production, the top five States are California (63.3% of U.S total), Florida (11.7%), Washington (9.8%), Oregon (2.0%), and Michigan (1.3%). Again, the 2002 fruit production sales are presented on Figure 14 with one green dot as five hundred thousand dollars and one blue dot, shown only in California and Florida, as five million dollars. The fruit production in the country is extremely concentrated in the Pacific region, and accounted for 75% of the U.S total. The spatial pattern on the map across other regions seems not to verify that metro counties produce much more fruit sales than nonmetro counties whereas the national trend indicates metro farms nation-wide produce about 80% of fruit sales (Figure 14). Table 32 summarizes shares of total fruit sales by metro status across regions. However, data of total state fruit sales are not reported for Arizona, Louisiana, Kansas, South Dakota, North Dakota, and Nevada. Thus, it is not possible to calculate the total sales of fruit production for some regions and then obtain shares of fruit sales by metro status in those regions. Therefore, we mark those regions as “NAP” (not applicable) on the table. Table 32 indicates that metro farms dominate fruit production in the Pacific, Northeast, and Southeast regions. Furthermore, even though it is not clear about the relationship between urban influence and fruit production because of missing sales, we actually cannot identify any region in which nonmetro farms produce more fruit sales than metro farms.

In the case of nursery and greenhouse production, the top five production states are California (22.4% of U.S total), Florida (12.6%), Oregon (5.5%), Pennsylvania (5.0%), and Texas (4.8%). The 2002 nursery and greenhouse production sales are presented on the map with one green dot as one million dollars and one blue dot, shown only in California and Florida, as \$2.5 million. The distribution of sales of nursery/greenhouse production seems to be homogeneously concentrated in the metro counties across regions (Figure 15). The statistics reported in Table 33 are consistent with the results on the map. Location plays an important role in nursery and greenhouse crop production. Except the unknown situation of Southern Plains (due to missing Census data), metro counties produce more nursery and greenhouse sales than nonmetro counties across regions.

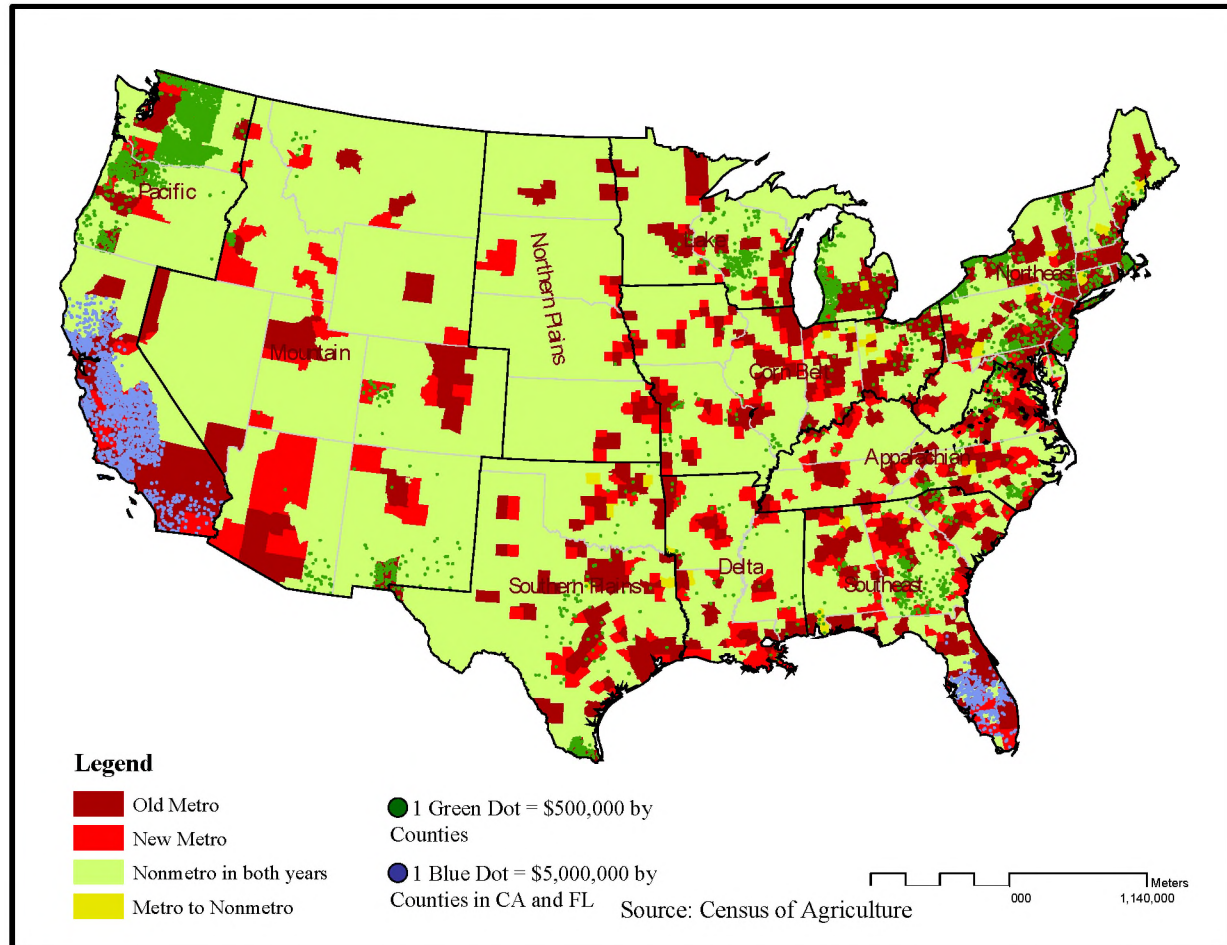
**Figure 13: Vegetables Sold by Metro Status, 2002**



**Table 31: Vegetables Sold by Metro Status, 10 Regions, 2002**

Region	Metro Counties			Non Metro	Missing Sales
	Old Metro	New Metro	Total		
	% of Total Vegetable Production in the Region				
1 Northeast	55.6%	7.8%	63.3%	32.9%	3.8%
2 Lake	25.6%	4.8%	30.4%	56.8%	12.8%
3 Corn Belt	35.8%	4.3%	40.2%	43.8%	16.1%
4 N. Plains	12.7%	1.1%	13.8%	43.8%	42.4%
5 Appalachian	9.4%	17.4%	26.8%	50.5%	22.7%
6 Southeast	44.1%	13.6%	57.7%	35.1%	7.2%
7 Delta	6.5%	8.2%	14.7%	58.5%	26.9%
8 S. Plains	35.5%	3.2%	38.7%	48.4%	12.9%
9 Mountain	10.5%	41.7%	52.3%	42.1%	5.6%
10 Pacific	73.2%	14.7%	87.9%	11.1%	1.1%
Total	49.6%	16.7%	66.3%	27.8%	6.2%

**Figure 14: Fruit Sold by Metro Status, 2002**



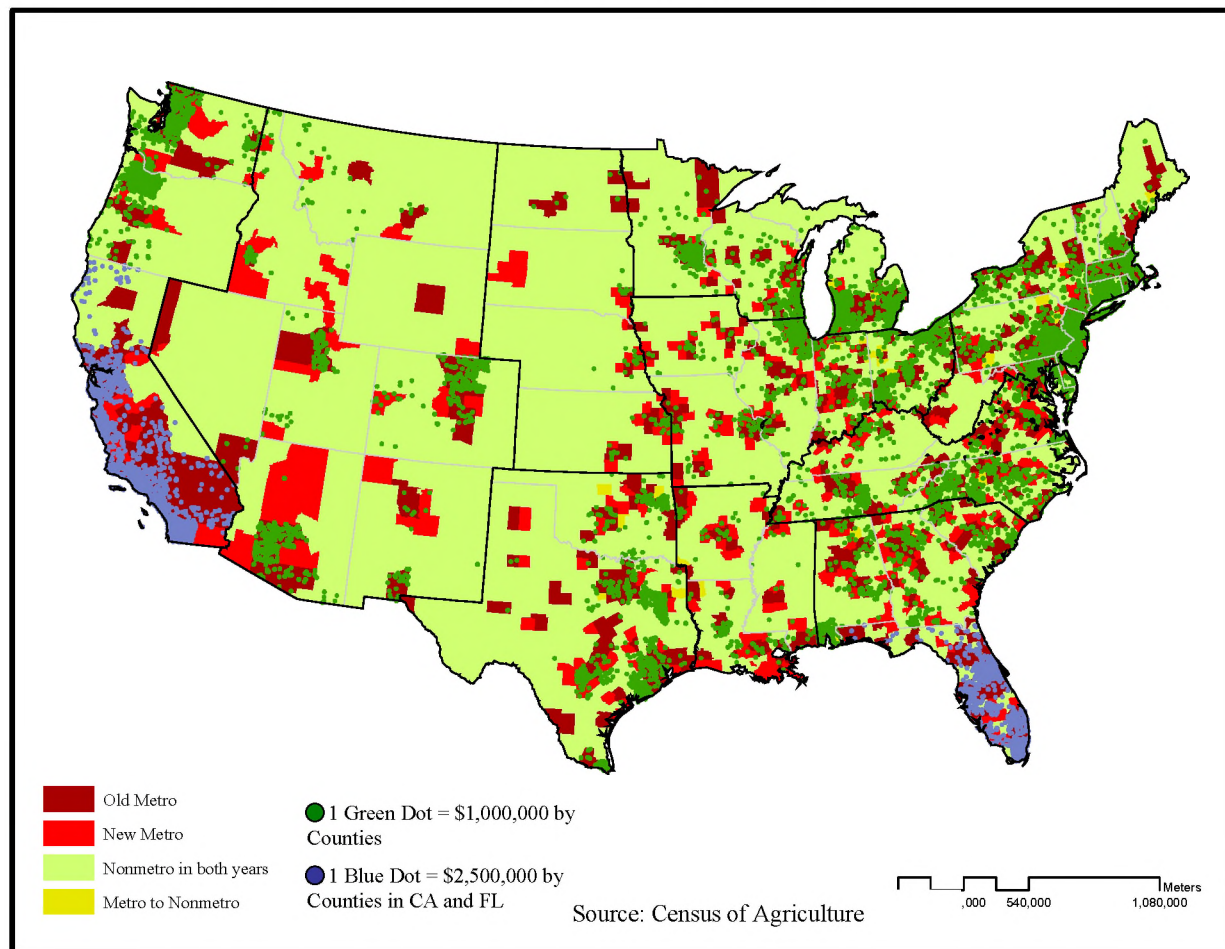
**Table 32. Fruit Sold by Metro Status, 10 Regions, 2002**

Region	Metro Counties			Non Metro	Missing Sales
	Old Metro	New Metro	Total		
	<i>% of Total Fruit Production in the Region</i>				
1 Northeast	58.3%	7.7%	65.9%	25.7%	8.3%
2 Lake	43.3%	4.1%	47.4%	47.8%	4.9%
3 Corn Belt	29.4%	15.5%	44.9%	30.0%	25.0%
4 N. Plains	N/R	N/R	N/R	N/R	N/R
5 Appalachian	13.9%	35.2%	49.0%	37.1%	13.9%
6 Southeast	33.2%	24.4%	57.7%	37.8%	4.5%
7 Delta	N/R	N/R	N/R	N/R	N/R
8 S. Plains	55.8%	4.0%	59.8%	23.8%	16.4%
9 Mountain	N/R	N/R	N/R	N/R	N/R
10 Pacific	78.6%	12.0%	90.6%	7.7%	1.7%
<b>Total</b>	<b>67.8%</b>	<b>13.2%</b>	<b>81.0%</b>	<b>14.0%</b>	<b>5.0%</b>

N/R: Not reported.



**Figure 15: Nursery and Greenhouse Products Sold by Metro Status, 2002**



**Table 33: Nursery and Greenhouse Products Sold by Metro Status, 10 Regions, 2002**

Region	Metro Counties			Non Metro	Missing Sales
	Old Metro	New Metro	Metro		
	% of Total Nursery/ GH Production in the Region				
1 Northeast	77.1%	5.5%	82.6%	11.9%	5.5%
2 Lake	72.5%	1.7%	74.1%	19.1%	6.8%
3 Corn Belt	62.3%	6.1%	68.4%	12.8%	18.8%
4 N. Plains	41.1%	6.7%	47.8%	6.9%	45.3%
5 Appalachian	35.0%	13.7%	48.7%	36.6%	14.7%
6 Southeast	59.6%	10.3%	69.9%	15.3%	14.8%
7 Delta	43.0%	14.2%	57.2%	17.6%	25.2%
8 S. Plains	38.1%	2.0%	40.1%	41.7%	18.2%
9 Mountain	61.7%	2.2%	64.0%	8.9%	27.2%
10 Pacific	85.9%	7.1%	93.0%	4.0%	3.0%
U.S Total	67.7%	6.9%	74.6%	13.9%	11.5%

### ***A Closer Look at the Northeast: Position of Metro Agriculture***

A focal point for this research is the economic circumstances surrounding specialty crop production in the Northeast. These circumstances are investigated with more depth in this section. First we examine the metro-nonmetro status of each of the 12 Northeast states before turning our attention to the structure of Northeast farming operations, emphasizing commodity sales. Finally, changes in the value of commodity sales are examined for agricultural census years 1982-1992 and 1992-2002. A shift-share analysis is employed to reference changes in specialty crop sales to national trends.

The Northeast is the nation's oldest and most densely settled region. The 12 Northeast states take up an area of just over 198,000 square miles (7% of the land in the 48 contiguous states) but accounted for 21% of the nation's 2005 population. Population density in the Northeast stands at 314 persons per square mile; this compares to a density of 98 persons per square mile for the contiguous US. According to current population estimates, the region's total population stands at 62.3 million; just under 90% of this total population is classified as metropolitan (Table 34).

The region's metropolitan population varies dramatically from state to state, making generalizations about relationships between open space uses like farming and population concentrations somewhat difficult. At one extreme, both New Jersey and Rhode Island are fully classified as metropolitan. At the other extreme, both New York and Pennsylvania have rather large nonmetropolitan populations; together these two states have about 3 1/2 million citizens residing in nonmetropolitan counties. As noted earlier, these allocations to metropolitan status depend on changes in the rate and distribution of population settlement but also upon redefinitions promulgated by OMB. For the past two decades, the reclassification to metro status in the Northeast has involved counties with a 2005 population of 3.2 million or about 5% of the total population. Despite dense population settlement, significant nonmetropolitan population concentrations are located in Connecticut, Delaware, Maryland, New Hampshire, Vermont, and West Virginia. Massachusetts has two counties classified as nonmetropolitan at present but each of these counties, interestingly, have populations well under 25,000.

Figure 16 further elaborates on these spatial relationships and demonstrates the concentration of metropolitan counties along the Boston-Washington corridor, often referred to as “Boswash”. Upstate New York counties are well represented in the metropolitan category as well along with pockets of metropolitan classification in New England, western Pennsylvania, and West Virginia.

According to the 2002 Census of Agriculture, the Northeast has nearly 169,000 farms. Considering the predominant enterprise on these farms, the Census classifies about 29,500 of this total into the specialty crop category—see Table 35. Considering all farms, 56% are situated in Metro counties, but this fraction goes to 69, 60, and 71%, respectively, for farms classified as vegetable, fruit, and nursery and greenhouse operations.

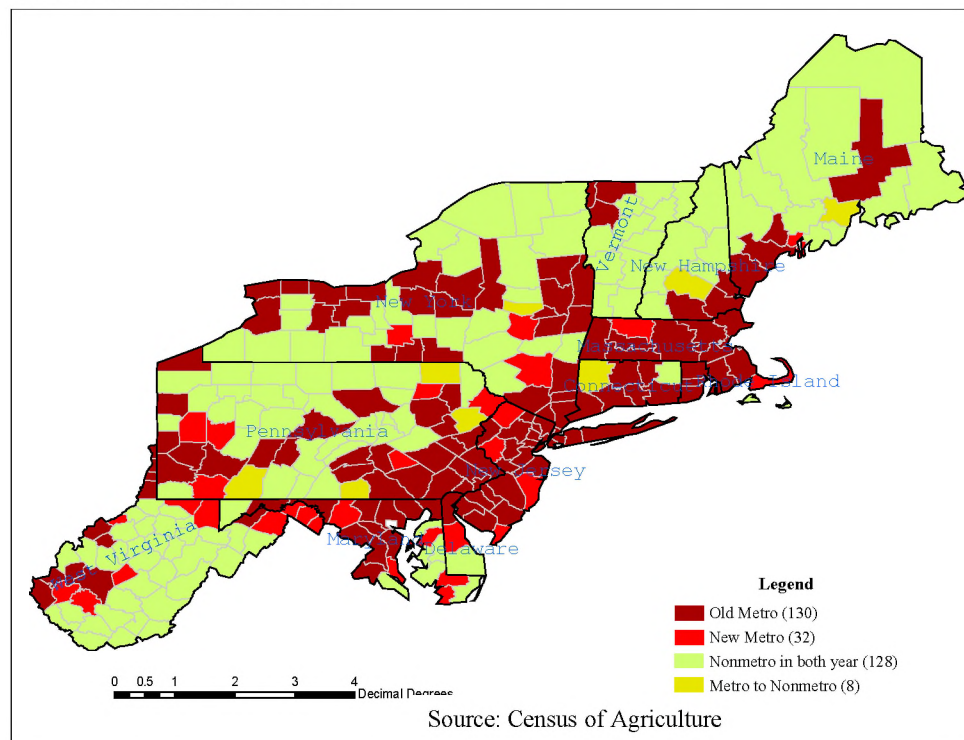
**Table 34: Population by State and Metropolitan Status, Northeast, 2005**

	Metro	New Metro	Non Metro	Total
	<i>Population</i>			
Connecticut	3,204,400	-	305,897	3,510,297
Delaware	523,008	143,968	176,548	843,524
Maine	732,372	36,962	552,171	1,321,505
Maryland	4,200,106	470,485	293,982	4,964,573
Massachusetts	6,074,135	298,848	25,760	6,398,743
New Hampshire	815,382	-	494,558	1,309,940
New Jersey	7,776,764	941,161	-	8,717,925
New York	17,372,728	314,988	1,566,914	19,254,630
Pennsylvania	9,831,342	608,890	1,989,384	12,429,616
Rhode Island	1,076,189	-	-	1,076,189
Vermont	205,230	-	417,820	623,050
West Virginia	639,409	360,957	816,490	1,816,856
<b>Northeast</b>	<b>52,451,065</b>	<b>3,176,259</b>	<b>6,639,524</b>	<b>62,266,848</b>
	<i>Percentage distribution</i>			
Connecticut	91.3	-	8.7	100
Delaware	62.0	17.1	20.9	100
Maine	55.4	2.8	41.8	100
Maryland	84.6	9.5	5.9	100
Massachusetts	94.9	4.7	0.4	100
New Hampshire	62.2	-	37.8	100
New Jersey	89.2	10.8	-	100
New York	90.2	1.6	8.1	100
Pennsylvania	79.1	4.9	16.0	100
Rhode Island	100.0	-	-	100
Vermont	32.9	-	67.1	100
West Virginia	35.2	19.9	44.9	100
<b>Northeast</b>	<b>84.2</b>	<b>5.1</b>	<b>10.7</b>	<b>100</b>

Source: US Census Bureau, 2006b.



**Figure 16: Changes in Nonmetropolitan and Metropolitan Status in the Northeast US, 1980-2003**



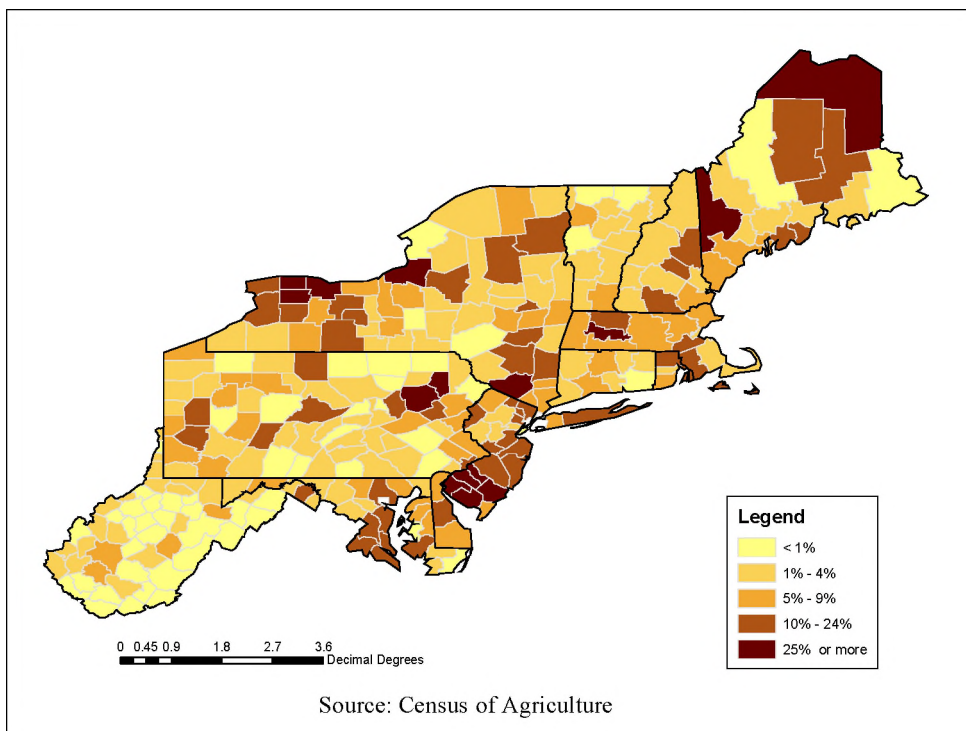
**Table 35: Farms by Industrial Classification (NAICS), 12 Northeast States, 2002**

	Total Farms	Metro		Nonmetro			
		<i>Old</i>	<i>New</i>	<i>Total</i>	<i>Nonmetro in both years</i>	<i>Metro to Nonmetro</i>	<i>Total</i>
		<i>Metro</i>	<i>Metro</i>				
	<i>Number</i>			<i>-- Percent of farms --</i>			
<b>Total farms</b>	<b>168,939</b>	<b>45.5</b>	<b>10.4</b>	<b>55.9</b>	<b>40.5</b>	<b>3.7</b>	<b>44.1</b>
Oilseed and grain	12,997	48.0	11.9	59.9	36.2	3.8	40.1
Vegetables and melons	7,254	59.4	9.2	68.5	29.1	2.3	31.5
Fruit and tree nuts	7,600	50.7	9.2	59.8	36.1	4.1	40.2
Greenhouse, nursery, and floriculture products	14,669	61.3	9.4	70.6	25.9	3.5	29.4
Other crop farming	39,660	41.3	10.1	51.4	44.3	4.3	48.6
Beef cattle	26,152	33.0	12.8	45.9	51.5	2.6	54.1
Cattle feedlots	5,715	45.5	11.3	56.9	39.2	3.9	43.1
Dairy cattle and milk production	18,896	40.8	6.0	46.7	48.8	4.5	53.3
Hogs and pigs	2,497	49.3	10.5	59.8	36.8	3.4	40.2
Poultry and eggs	5,388	33.3	16.3	49.5	47.7	2.8	50.5
Sheep and goats	5,153	47.5	12.4	59.9	36.8	3.3	40.1
All other animal production	22,958	54.8	10.4	65.3	31.0	3.8	34.7

Source: Census of Agriculture

The value of farm products sales may be a more incisive measure of specially crop production. The distribution across metro and nonmetro counties is shown in Table 36. Looking first at all crops sales, metro counties account for nearly 75% of all sales in the Northeast. Vegetables, along with potatoes, are not overrepresented in Metro counties compared to all crops. One reason for this is that the USDA has seen fit to combine vegetable and potato production, thus blurring the useful distinctions to be made between potatoes and several other high valued vegetable crops. The spatial distribution for these categories is highlighted in Figure 17, a map that indicates the proportion of market sales attributable to vegetables, melons, potatoes and sweet potatoes. The spatial data clearly illustrate that the results one obtains when amalgamating such a wide variety of farm commodities. These crops range from potato production in northern Maine to fresh market and processed vegetable production in western New York and in New York's Finger Lakes region. Important concentrations of vegetable sales are also found in Pennsylvania and New Jersey. There are important exceptions, but higher proportions of vegetable sales are often coincident with the location of larger urban cores in the region, signaling the importance of ready access to larger population concentration for seasonal fresh market sales.

**Figure 17: Vegetables, Melons, Potatoes, and Sweet Potatoes as Percent of Total Market Value of Agriculture Products Sold, Northeast, 2002**



**Table 36: Value of agricultural products sold by metro status, 12 Northeast states, 2002**

		Metro			Nonmetro			Missing Sales
	Sales	Old Metro	New Metro	Total	Nonmetro in both years	Metro to Nonmetro	Total	
	Mill. \$	-- Percent of total U.S sales --						
Crops and nursery/greenhouse	4,812.7	65.4	8.5	73.9	23.0	2.8	25.8	0.3
Grains, oilseeds, dry beans, and dry peas	653.6	41.3	14.8	56.1	35.4	2.1	37.5	6.3
Tobacco	73.1	84.6	6.3	90.9	4.0	0.0	4.0	5.1
Vegetables, melons, potatoes, and sweet potatoes	939.9	55.6	7.8	63.3	32.3	0.6	32.9	3.8
Fruits, tree nuts, and berries	529.1	58.3	7.7	65.9	18.7	7.0	25.7	8.3
Nursery, greenhouse, floriculture, and sod	2,222.4	77.1	5.5	82.6	9.4	2.5	11.9	5.5
Cut Christmas trees and short-rotation woody crops	51.5	44.4	5.8	50.2	41.7	3.0	44.7	5.1
All other crops	330.4	38.5	8.3	46.8	41.9	5.8	47.7	5.5
<u>Livestock, poultry, and their products</u>	7,699.0	38.1	10.4	48.6	47.6	3.4	44.7	0.4
Poultry and eggs	2,320.6	24.5	15.1	39.6	45.1	2.1	47.7	13.1
Cattle and calves	955.3	36.3	6.0	42.3	45.2	4.2	49.4	8.2
Milk and other dairy products from cows	3,696.7	39.7	6.2	45.8	49.1	3.9	53.0	1.2
Hogs and pigs	299.4	50.5	10.4	60.9	36.0	1.1	37.2	1.9
Sheep, goats, and their products	26.6	34.7	6.6	41.3	47.9	4.3	52.2	6.5
Horses, ponies, mules, burros, and donkeys	117.0	64.6	8.7	73.3	12.1	8.9	21.0	5.7
Aquaculture	96.9	25.7	7.9	33.6	5.0	1.4	6.5	59.9
Other animals and other animal products	66.4	17.1	3.6	20.6	12.7	1.6	14.3	65.1
<u>Agricultural products sold directly</u>	235.9	64.3	9.5	73.8	21.4	2.8	24.2	2.0
<u>Certified organically produced commodities</u>	50.1	27.6	2.5	30.1	32.1	0.5	32.6	37.3
<b>Total sales</b>	<b>12,511.6</b>	<b>48.7</b>	<b>9.7</b>	<b>58.4</b>	<b>38.4</b>	<b>3.1</b>	<b>41.6</b>	<b>0.0</b>

Source: Census of Agriculture

Nearly two thirds of total fruit sales are situated in Metro counties as well (Table 37). Again, a wide variety of commodities falls in the fruit category for the Northeast. A predominant category includes numerous tree fruits but berry and vine crops are important as well, along with such specialties as cranberries and vinifera grapes. Fruit sales as a percent of total farm sales and county level are mapped in Figure 18. Blueberry production in Maine and New Jersey is clearly evidenced, along with cranberry production in Massachusetts. Grape and apple production along the shores of Lake Erie, Lake Ontario, and Lake Champlain in Upstate New York also stand out on this thematic map.

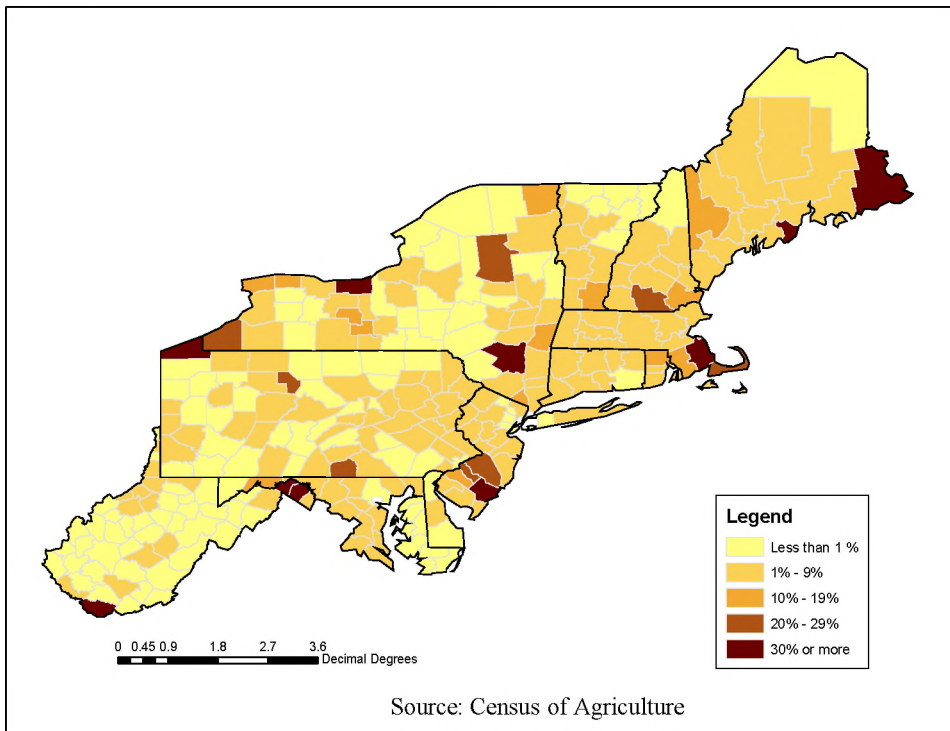
About 18% of total farm sales in the Northeast trace to the production of nursery and greenhouse products (Table 36). As expected, metro counties account for the overriding share of these commodity sales. According to the 2002 Census of Agriculture, nearly 85% of all revenue generated in the green industries is attributable to operations located in metro counties. This dramatic association between population concentrations and product sales is well illustrated in Figure 19, which shows the proportion of county total product sales attributable to nursery and greenhouse products. These farm operations are heavily concentrated along the Boston-Washington corridor, and extend north into southern Vermont and New Hampshire. Green industries are also more predominant in Metro cores in upstate New York, western Pennsylvania, and southern West Virginia.

### ***A Closer Look at the Northeast: Changes in Farm Commodity Production***

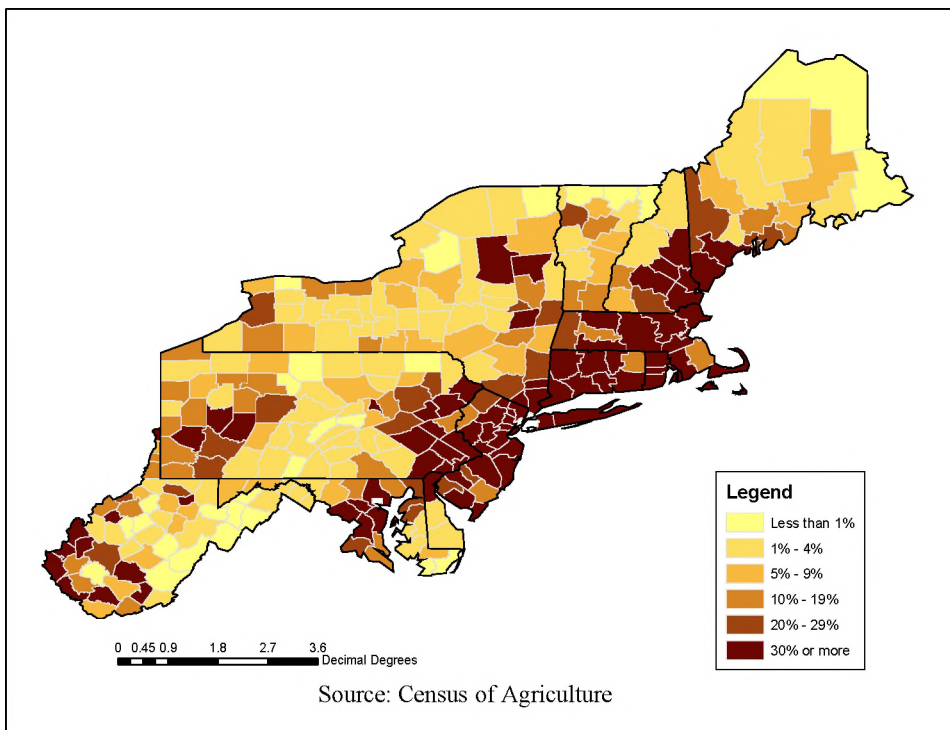
Like the rest of the US, the Northeastern states have undergone dramatic changes in farm output over the past two decades. Those changes are highlighted and discussed in this section. As a point of departure, exhaustive information on farm sales by all major crop and livestock categories are presented. Then, a shift-share analysis is constructed using available data for two of three major Northeast specialty crop sectors.

Turning first to longer-term changes in commodity sales, Table 37 shows state-level data on value of farm products sold for both crops and livestock as reported in the 2002 Census of agriculture along with percentage changes from 1882-1992 and 1992-2002 to provide some long-term perspective. This perspective must be interpreted with extreme care, however, because targeting sales in any single year and comparing them with another single year may not reflect trend to the extent that the value of sales fluctuates materially at state-level from year-to-year. That is, the Census year can easily be an “off year” for some commodities in some states due to the vagaries of weather and other factors affecting commodity demand and supply. An even larger challenge is to decide what impact changes in USDA Census gathering procedures have had on small area data for the US agriculture. It should be noted that the USDA advises users to avoid comparing 2002 Census results with unadjusted reports from earlier census years to the extent practicable.

**Figure 18: Fruit, Tree Nuts, and Berries as Percent of Total Market Value of Agriculture Products Sold: 2002**



**Figure 19: Nursery and Greenhouse Product Sales as Percent of Total Market Value of Agriculture Products Sold: 2002**



With these limitations firmly in mind, Table 38 shows that Northeast agriculture registered a 19% increase in nominal dollar terms over the 10-year interval 1992-2002. Percentage increases were appreciably larger in Connecticut, New Hampshire, New Jersey, Rhode Island, and West Virginia. These increases, however, are calculated from a relatively low base-- under \$500 million. Vermont's 2002 sales base was under \$500 million in 2002 as well, but the aggregate value of farm sales in Vermont increased by less than regional average-- about 14%-- between 1992 and 2002. Sales increases were relatively more modest in Delaware, Maryland, and Massachusetts during the 1990s too. New York and Pennsylvania account for nearly 60% of total product sales in the region and both states registered sales increases hovering in the 19% range between 1992 and 2002.

All Northeast states have been registering appreciable increases in sales of vegetables and nursery/greenhouse products. Values for changes on 10-year interval are erratic on percentage basis and often reflect sales movements from a relatively small base. More than a 8-fold increase, for example, was reported in the Census for the state of Maine between 1992 and 2002.

As mentioned above, this result is an amalgamation of changes on the ground and the ambiguities introduced by revised census data collection procedures.

Regardless of data interpretation, the information presented in Table 38 suggests that sales of fruit commodities are clearly on a different trajectory in the region compared to other specialty crop categories. Fruit sales reported for 2002 topped \$529 million but this amount is nearly 7% less than the nominal value reported in the 1992 Census. Important differences occur between states, though. In the Northeast, Maryland and New Jersey registered significant increases over this 10-year period.

Nursery/greenhouse products account for nearly a fifth of total farm commodity sales in the region, and sales increases were registered across the board for these green industries between 1992 and 2002 and for the earlier 1982-1992 interval as well. The overall increase in sales in the 12 state region during the 1990s amounted to 65%; the corresponding percentage change during the 1980s was 89%.

It is important to put these changes in commodity sales in context. We prefer a national context and to that end, percentage changes in sales for key commodity sectors in the Northeast are compared with those for the US as a whole over both 10-year intervals—see Figure 20. Without exception, these Census data suggest that increases in commodity sales nationally are more robust nationally and they are in the Northeast region. This conclusion extends to important specialty crop categories as well as more traditional commodity sectors.

Figure 20 also demonstrates the obvious: because of varying demand and supply circumstances, sales are expanding or contracting at different rates depending on commodity. This makes an assessment of production shifts and their implications for the competitive position of growers in a multistate region a complex issue. One approach to gain more clarity is to use shift-share analysis to foster a more orderly pattern of thought on changes in Northeast agriculture.

**Table 37. Crop and livestock sales by commodity group, 12 Northeast states, 2002**

	Total	All Crops	Grains	Fruit	Vegetables	Nursery Products	All Livestock/Poultry	Poultry	Cattle	Milk	Sheep
	Value of Sales (\$1,000)										
Connecticut	470,637	327,527	1,410	14,721	19,120	245,773	143,110	62,411	7,025	56,523	528
Delaware	618,853	150,404	72,393	2,496	50,773	22,420	468,449	440,774	3,254	20,651	45
Maine	463,603	222,356	7,794	33,970	126,049	37,334	241,247	78,848	15,994	87,544	801
Maryland	1,293,303	450,202	167,555	12,967	60,488	188,484	843,101	583,343	50,570	169,458	1,179
Massachusetts	384,314	277,069	1,358	55,508	38,289	153,540	107,244	12,107	9,612	N/R	1,127
New Hampshire	144,835	83,149	1,246	9,321	8,465	53,691	61,686	6,251	5,140	N/R	785
New Jersey	749,872	657,494	29,885	87,148	167,956	356,863	92,378	26,041	7,094	29,154	1,482
New York	3,117,834	1,135,129	156,300	180,540	322,577	344,320	1,982,706	106,620	251,121	1,560,895	9,421
Pennsylvania	4,256,959	1,320,914	203,156	109,383	125,923	732,709	2,936,045	745,624	441,671	1,393,992	7,355
Rhode Island	55,546	47,138	171	2,358	5,527	37,593	8,408	1,766	735	3,859	104
Vermont	473,065	71,583	2,768	9,270	10,140	22,803	401,482	5,875	45,106	342,440	1,581
West Virginia	482,814	69,693	9,575	11,443	4,613	26,849	413,121	250,922	117,967	32,202	2,168
<b>NE total</b>	<b>12,511,635</b>	<b>4,812,658</b>	<b>653,611</b>	<b>529,125</b>	<b>939,920</b>	<b>2,222,379</b>	<b>7,698,977</b>	<b>2,320,582</b>	<b>955,289</b>	<b>3,696,718</b>	<b>26,576</b>

N/R: Not reported

Source: Census of Agriculture

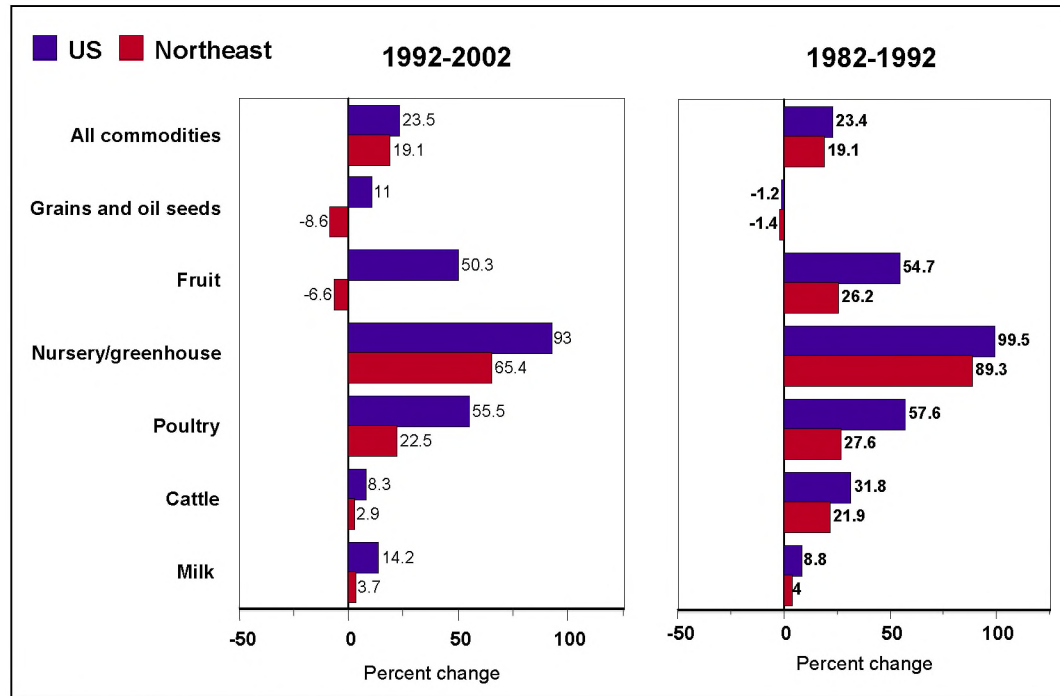
**Table 38. Change in crop and livestock sales by commodity group, 12 Northeast states, 2002**

	Total Value	All Crops	Grains	Fruit	Vegetables	Nursery Products	All Livestock/Poultry	Poultry	Cattle	Milk	Sheep
Percent Change, 1992-2002											
Connecticut	39.7	78.7	61.7	21.3	43.6	94.2	-6.9	-7.0	-33.5	-20.5	33.0
Delaware	10.6	5.2	-15.7	-22.3	125.0	5.1	12.4	18.2	-78.3	17.0	-43.8
Maine	7.7	2.9	72.2	-31.9	889.6	79.3	12.6	-11.0	12.1	-2.7	11.3
Maryland	10.6	16.0	-23.4	25.2	60.2	112.7	7.9	18.0	-6.3	-11.3	12.8
Massachusetts	9.6	8.6	49.7	-53.1	41.9	74.4	12.3	-1.6	-4.5	N/R	102.3
New Hampshire	27.0	81.8	N/R	-10.4	61.3	123.1	-9.7	-49.2	-18.7	N/R	56.4
New Jersey	40.7	52.5	-34.8	40.4	36.6	96.6	-9.3	12.2	-40.6	-39.2	107.9
New York	18.9	40.3	33.7	0.7	78.4	57.8	9.4	31.8	14.8	9.2	168.2
Pennsylvania	19.2	26.8	-12.1	23.4	112.8	37.6	16.1	24.3	3.6	12.7	57.1
Rhode Island	40.6	71.8	N/R	1.6	124.6	92.8	-30.4	-62.9	-16.5	-23.2	112.2
Vermont	13.9	101.7	335.9	-2.6	148.5	141.0	5.7	100.7	3.9	4.2	63.2
West Virginia	32.6	10.5	-3.3	-44.0	183.4	107.3	37.2	85.0	0.7	-19.0	-15.9
<b>NE total</b>	<b>19.1</b>	<b>32.2</b>	<b>-8.6</b>	<b>-6.6</b>	<b>91.9</b>	<b>65.4</b>	<b>12.1</b>	<b>22.5</b>	<b>2.9</b>	<b>3.7</b>	<b>68.1</b>
Percent Change, 1982-1992											
Connecticut	18.1	79.6	-10.7	27.5	66.0	103.9	-16.1	-9.7	-12.2	-20.9	23.7
Delaware	51.1	29.6	14.6	38.5	33.3	167.2	60.1	68.7	22.0	13.3	207.7
Maine	7.7	51.2	-7.5	47.2	139.7	185.3	-16.5	-34.7	-6.3	-5.6	-1.5
Maryland	13.6	14.4	7.0	-20.0	58.5	93.5	13.2	34.9	-1.0	-6.5	34.1
Massachusetts	24.6	83.0	8.5	94.2	40.5	89.4	-32.8	-51.7	-17.5	-25.2	25.2
New Hampshire	11.3	74.5	-100.0	37.3	61.2	115.5	-10.4	2.8	-16.2	-11.9	34.9
New Jersey	22.3	33.9	-4.3	-5.1	26.6	100.1	-10.6	87.2	-18.7	-24.3	31.5
New York	8.0	23.0	-25.9	22.0	26.8	100.6	2.5	-30.7	11.4	3.0	28.9
Pennsylvania	25.3	38.6	5.3	18.9	50.8	72.2	20.6	31.4	31.3	14.3	18.4
Rhode Island	30.1	51.2	-100.0	36.5	48.5	82.3	-1.3	1.4	-12.5	-13.3	-43.0
Vermont	12.4	76.9	-30.0	25.2	158.4	217.7	8.7	-52.4	20.8	8.1	55.5
West Virginia	50.4	10.3	-25.7	-20.5	113.9	94.8	62.8	152.9	56.0	-12.0	-34.2
<b>NE total</b>	<b>19.1</b>	<b>35.4</b>	<b>-1.4</b>	<b>26.2</b>	<b>36.2</b>	<b>89.3</b>	<b>11.9</b>	<b>27.6</b>	<b>21.9</b>	<b>4.0</b>	<b>8.8</b>

Source: Census of Agriculture (N/R: Not Reported)



**Figure 20. Growth in market value of farm products sold, selected commodity sectors, US and 12 Northeast states, 1982-1992 and 1992-2002**



Source: Census of Agriculture

The methodology used in this analysis takes the theoretical framework described by Loveridge (1998). Shift-share analysis decomposes change in income (sales) of an industry in a county over a given time period into three components: the national growth effect, the industry mix effect, the competitive effect. The sum of these three effects equals the actual change in sales within a county over a prescribed time period.

The calculations performed were based on the following classic shift-share model:

$$E_{ij}^t - E_{ij}^{t-1} \equiv \Delta E_{ij} \equiv NE_{ij} + IM_{ij} + CE_{ij}$$

where:

- $E_{ij}^t$  is income (sales) in the  $i$ th industry in the  $j$ th county at time  $t$
- $NE_{ij}$  is the National Growth Effect
- $IM_{ij}$  is the Industry Mix Effect
- $CE_{ij}$  is the Competitive Effect

The three effects are calculated as follows:

$$NE_{ij} = g_{00} \times E_{ij}^{t-1}$$

$$IM_{ij} = E_{ij}^{t-1} \times (g_{i0} - g_{00})$$

$$CE_{ij} = E_{ij}^{t-1} \times (g_{ij} - g_{i0})$$

Where:

$g_{ij}$	is percentage change of income (sales) in sector $i$ , county $j$ relative to a base year ( $t-1$ )
$g_{i0}$	is percent change of national income (sales), industry $i$ ,
$g_{00}$	is percentage change in nationwide income (sales) of agriculture
$I$	is industry designator,
$J$	is county designator,
$t-1$	is the income (sales) data from the previous Census
$T$	is the income (sales) data from the current Census

1. *National growth effect*: this is the amount the county would have increased or decreased if it had changed at the same rate as national growth;
2. *Industry mix effect*: This is the increase or decrease due to the differences between the makeup of agricultural sectors in the county compared with that in the nation;
3. *Competitiveness effect*: This is the change due to local changes not taken into account through the national growth or industry mix effects.

The shift-share technique enables a quantitative analysis to identify the strengths, weaknesses, opportunities and threats to industry sectors within a particular region. For example, large positive competitive effects can be interpreted to indicate the strengths of the region, whereas large positive industry mix effects indicate the opportunities for the region. Conversely, large negative industry mix effects imply an industry which is not supported by local industries. This industry might face more barriers to growth than the same industry in another region exhibiting a positive result. Large negative competitive effects for an industry indicate a major weakness in terms of production growth. The classic model also declares that the county's economies should change at national growth rates unless comparative advantages (or disadvantages) exist in that county. More and more industries competing for the market share on the national basis. Using the nation as reference economy also can provide regional or statewide totals of the industry mix and competitive effects that reflect the region's or state's position to the nation.

Shift-share analyses receive mixed reviews in the academic literature. Many observers are concerned, correctly, that the method reflects very little economic content. This means that the shift-share calculations are not always well-suited to making projections or prescribing policy for promoting economic development (Loveridge and Selting; Selting and Loveridge; Stevens and Moore). Instead, we use these calculations to frame changes in specialty crop commodity production in the Northeast in a more insightful fashion and in ways that foster consideration of the wider national scene for commodity production.

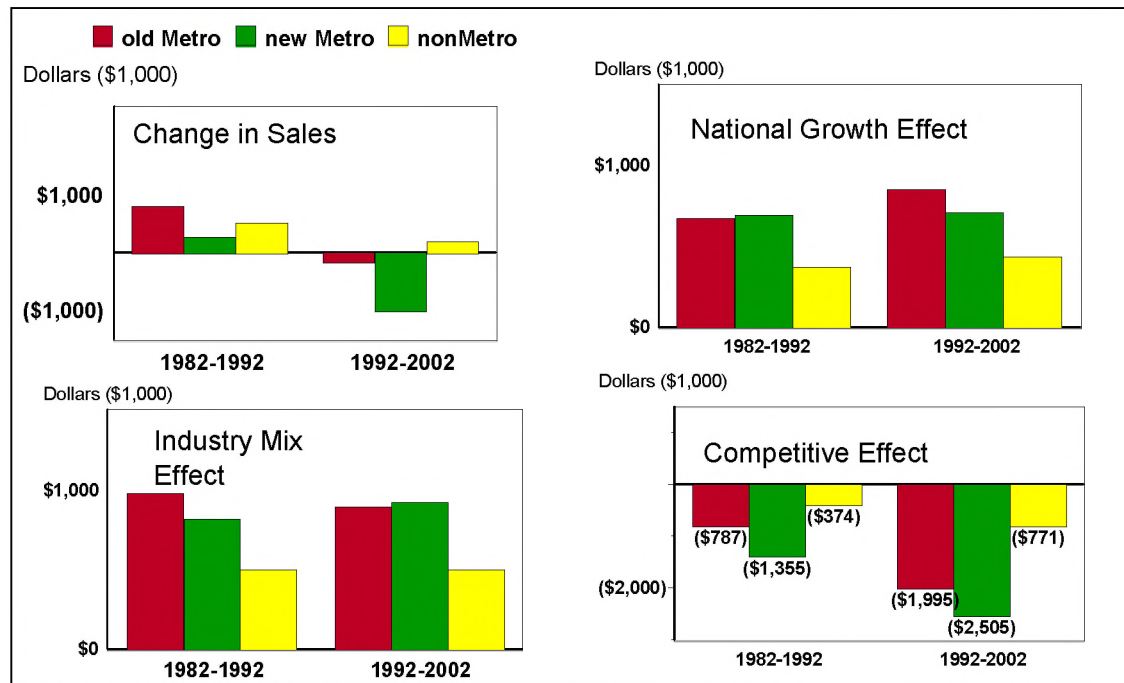
Because of the chronic data limitations described earlier in this report, we were unable to make shift-share calculations for vegetable crop sales categories. Further, because of missing data, due to county-level data suppression by the USDA, the calculations were confined to only a fraction of the 298 counties incorporated into our assessment of metro-nonmetro agriculture.

Results for fruit commodities and nursery/greenhouse commodities are summarized in Figures 21 and 22. For fruit sales, we were able to make calculations in 182 counties. Figure 21 shows mean changes in sales, national growth effects, industry mix effects, and competitive effects for these counties. Considering the 1992-2002 interval, older metro counties realized decreased fruit commodity sales on average; newer metro counties saw even more abrupt decreases while nonmetro counties realized a small gain on average. This pattern contrasts sharply with the change in sales observed in these counties during the 1982-1992 interval. During the 1980s all three metropolitan classes realized sales gains on average. Those sales gains were the most robust in older metro counties across the region.

Disaggregating those sales data to control for sales changes attributable to national growth and industry mix in the more rapidly growing US fruit sector brings the Northeast's competitive position into sharper relief. As shown in the southeast quadrant of Figure 21, all three metropolitan categories have realized negative competitive effects since 1982. Those deteriorating competitive effects have been the sharpest in newly designated metro counties on average.

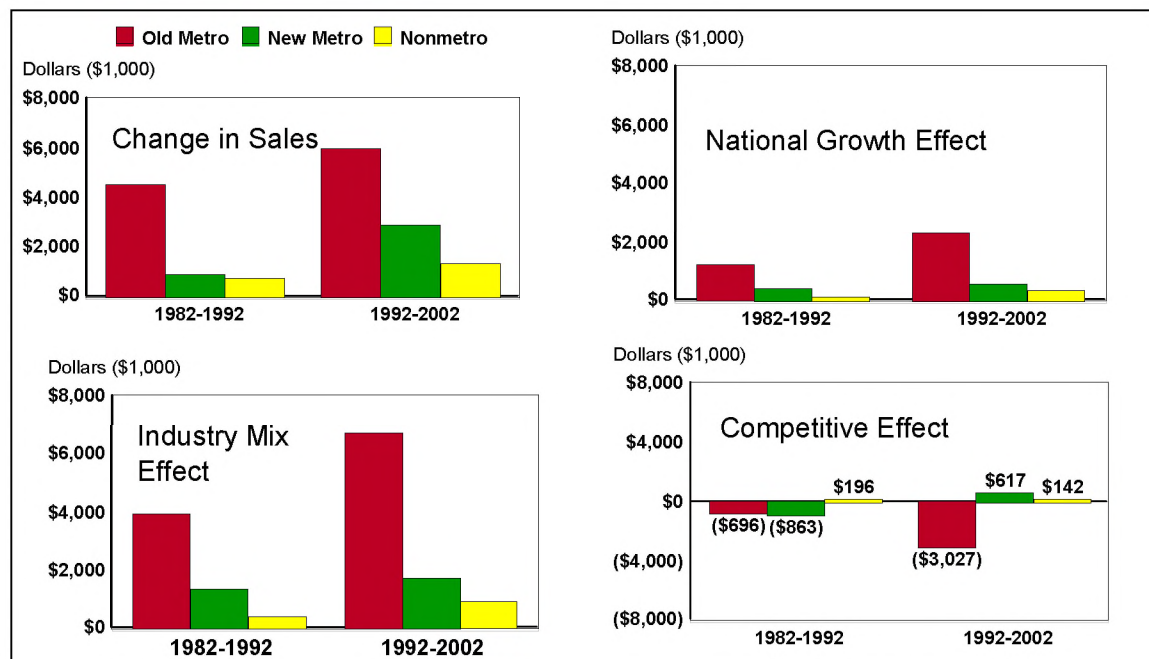
As shown in Figure 22, census data are more robust at the county level for reports on sales of nursery/floriculture products. We have data on 217 of 298 counties, thus lending more certainty to the shift-share calculations. As demonstrated in the northwest quadrant of Figure 22, northeast counties in all metro categories realized increases in sales of nursery/floriculture products. And, further, those sales increases were more robust, on average, in older more densely populated metropolitan counties. This pattern holds for both 10 year intervals included in this study. Taking national growth effects and industry mix effects into account once again provides some insight on the competitive position of growers in various metropolitan settings. The results for this sector contrast rather sharply with those obtained for fruit sales and discussed above. Namely, nursery/greenhouse growers have approximately maintained their competitive position, considering the national scene, for these high-value specialty crops in several important cases. One exception is older metro counties where, on average, the calculations suggest that sales deteriorated after controlling for national growth and industry mix affects.

**Figure 21 Fruit sales, average for 182 counties 12 Northeast States, 1982-2002**



Source: Derived from the Census of Agriculture

**Figure 22. Nursery and Greenhouse Product Sales, average for 217 counties in 12 Northeast States, 1982-2002**



Source: Derived from the Census of Agriculture

## Summary and Discussion

The U.S. follows worldwide demographic trends and realizes population growth in urban areas. A very important American expression for urban area is the category metropolitan. This definition follows county lines and allows one to compare the geography of population settlement with the geography of commodity agriculture. The comparisons are not straightforward because individual counties areas are periodically reclassified from nonmetropolitan to metropolitan status (and from metropolitan to nonmetropolitan on occasion). These reclassifications sweep up commodity production once characterized as rural as well. The last few decades have brought a significant spatial expansion of urban areas and as a result, an increasing number of farms are operating under urban influence in so much as they are situated in counties classified as metropolitan.

Based on these changes in definition of Metropolitan Statistical Areas (MSA's) designated by the Office of Management and Budget throughout the years, the number of counties included in MSA's increased 287% between 1950 to 2003 from 273 to 1,056 counties, and the metro land area increased three fold (303%) during the same period. The population residing in metropolitan areas increased by 52.4 million (from 189.6 to 242 million between 1990 and 2005).

Urbanization requires farm operators to adapt to increased competition for land as well as their proximity to a growing number of non-farm residents. Metro farms are generally smaller in land area, generate higher receipts per acre and use more farmland more intensively than their counterparts in nonmetro counties. This means more dependence on high value specialty crops, such as fresh fruits and vegetables, amenable to sales through specialized market niches such as restaurants and gourmet grocery outlets, or directly to consumers at road-side stands, farmers' markets, or U-pick. Land conversion to residential, commercial, and other developed uses invariably offers a market opportunity to producers of nursery and greenhouse products.

Our review of Census data shows that, when farms are classified by predominant enterprise, 56% of vegetable and melon farms, 73% of fruit and tree nut farms, and 66% of greenhouse, nursery and floriculture production farms in the U.S. are located in metro counties. Overall, metro counties account for 24% of the nation's farmland acreage but 41% of all farms are located there. Metropolitan counties are also predominant with respect to equine species, and account for more than 70% of the total farms with equine as the major source of farm receipts. Moreover, agriculture direct sales to consumers (65%) and organic production sales (50%) are also mainly by metro farms. These agriculture sectors tend to produce higher sales per acre than other agriculture enterprises.

Our analysis shows that, as expected, many nonmetro counties in some farm production multistate regions are also heavily vested in specialty crop production. In the Northeast, Southeast, Mountain, and Pacific regions, metro areas produce more sales than nonmetro areas. In the Lake, Appalachian, and Delta regions, nonmetro counties produce more vegetable sales. With respect to fruit production, the top five States are California (63.3% of U.S total), Florida, Washington, Oregon, and Michigan. Fruit production in the country is concentrated in the Pacific region, accounting for 75 % of the U.S total.

With respect to nursery/greenhouse production, the top five production states are California, Florida, Oregon, Pennsylvania, and Texas. The distribution of sales of nursery/greenhouse production seems to be homogeneously concentrated in the metro counties across regions. Location plays the important role for nursery/ greenhouse crop production. Except for the Southern Plains states, where the Census publishes insufficient data at county level, our analysis shows that metropolitan counties produce more nursery/ greenhouse sales than nonmetro counties across all regions.

This study was motivated by the economic circumstances confronting commodity agriculture in the Northeast. This region is the nation's oldest and most densely settled. The 12 Northeast states take up 7% of the land in the 48 contiguous states but account for 21% of the nation's 2005 population (62.3 million); just under 90% of this total population is classified as metropolitan.

According to the 2002 Census of Agriculture, the Northeast has nearly 169,000 farms. Considering the predominant enterprise on these farms, the Census classifies about 29,500 of this total into the specialty crop category. Considering all farms, 56% are situated in Metro counties, but this fraction goes to 69, 60, and 71%, respectively, for farms classified as vegetable, fruit, nursery/greenhouse operations.

When all crops sales are considered, metropolitan counties account for nearly 75% of total sales in the Northeast. Vegetables, along with potatoes, are not overrepresented in metropolitan counties compared to all crops. This result is partially an artifact of data management decisions made in the USDA. For the Census in 2002, the USDA decided to combine vegetable and potato production reporting crops sales at the county level. This decision blurs the useful distinctions to be made between potatoes, a field crop, and several other high valued vegetable crops.

Nearly two thirds of total fruit sales are situated in metropolitan counties as well. Again, a wide variety of commodities falls in the fruit category for the Northeast. A predominant category includes numerous tree fruits, but berry and vine crops are important as well, along with such specialties as cranberries and vinifera grapes. About 18% of total farm sales in the Northeast trace to the production of nursery, greenhouse, floriculture, and sod crops; metropolitan counties account for the overriding share of these commodity sales. According to the 2002 Census of Agriculture, nearly 85% of all revenue generated in the green industries is attributable to operations located in northeast counties presently classified as metropolitan.

Assessments of production trend in this study are very tentative. By necessity, with a focus on production at county level, we were confined to interval data from the Census of Agriculture. Targeting sales in any single Census year may not reflect trend to the extent that the value of sales fluctuates materially from year-to-year. An even larger challenge is to decide what impact changes in USDA Census gathering procedures have had on small area data for the US agriculture. It should be noted that the USDA advises users to avoid comparing 2002 Census results with unadjusted reports from earlier census years to the extent practicable.

With these limitations firmly in mind, we arranged comparisons of production change over two 10-year intervals, 1982-1992 and 1992-2002. Northeast agriculture registered a 19% increase in nominal dollar terms over the 10-year interval 1992-2002. Percentage increases were appreciably

larger in Connecticut, New Hampshire, New Jersey, Rhode Island, and West Virginia. These increases, however, are calculated from a relatively low base-- under \$500 million. Vermont's 2002 sales base was under \$500 million in 2002 as well, but the aggregate value of farm sales in Vermont increased by less than regional average-- about 14%-- between 1992 and 2002. Sales increases were relatively more modest in Delaware, Maryland, and Massachusetts during the 1990s too. New York and Pennsylvania account for nearly 60% of total product sales in the region and both states registered sales increases hovering in the 19% range between 1992 and 2002.

All Northeast states registered appreciable increases in sales of vegetables and nursery/greenhouse products over the time span considered. Values for changes on 10-year interval are erratic on percentage basis and often reflect sales movements from a relatively small base. The results are difficult to interpret because they are an amalgamation of changes on the ground and the ambiguities introduced by revised census data collection procedures. Regardless of data interpretation, however, sales of fruit commodities are clearly on a different trajectory in the Northeast compared to other specialty crop categories. Fruit sales reported for 2002 topped \$525 million but this amount is nearly 7% less than the nominal value reported in the 1992 Census. Important differences occur between states, though. In the Northeast, Maryland and New Jersey registered significant increases over this 10-year period.

Nursery/greenhouse products account for nearly a fifth of total farm commodity sales in the region, and sales increases were registered across the board for these green industries between 1992 and 2002 and for the earlier 1982-1992 interval as well. The overall increase in sales in the 12 state region during the 1990s amounted to 65%; the corresponding percentage change during the 1980s was 89%.

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## **Appendices**

## Appendix A- Mail Questionnaire

### 2007 Farm Bill: Policy Options and Consequences for Northeast Specialty Crop Industries

*Please take a few minutes to complete this questionnaire and  
return it in the enclosed postage-paid envelope. Thank you!*

1. Name: \_\_\_\_\_

Title: \_\_\_\_\_

Mailing Address: \_\_\_\_\_  
\_\_\_\_\_

Telephone: \_\_\_\_\_

Email address: \_\_\_\_\_

2. You are (please circle ALL that apply):

1 Executive Director or Chairperson

2 Member, Board of Directors

3 Elected/appointed public official

4 Farmer/producer

5 Agribusiness

6 Local or state agency employee

7 Other (Please specify.)

\_\_\_\_\_

3. In general, should the government fund programs that provide income support for specialty crop agricultural producers?

Yes \_\_\_\_

No \_\_\_\_

4. If the answer to Question 3 is Yes, what should the programs be? Please rank the following from 1=most to 5=least important, using each ranking only once.

#### Rank

Direct payments

\_\_\_\_\_

<b>Countercyclical payments</b>	_____
<b>Marketing loans</b>	_____
<b>Subsidized insurance</b>	_____
<b>Disaster assistance</b>	_____

5. The 2007 Farm Bill may need to reduce or reallocate Federal funding for current farm programs. Please indicate how important you feel it is to keep funding for the following programs at or above current levels. (Circle one: 1 = least important, 2 = less important, 3 = not sure, 4 = important, 5 = most important)

<b>Fixed, decoupled crop commodity payments (direct payments)</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Crop commodity payments tied to price (counter- cyclical payments)</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Crop commodity payments tied to price and production (commodity loans, LDPs, etc.)</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Land retirement conservation programs (CRP, WRP)</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Working land conservation programs (EQIP, WHIP, CSP, etc.)</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Agricultural land and grassland preservation programs (FRPP, GRP)</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Subsidized insurance, including crop and revenue insurance</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Disaster assistance programs</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Trade adjustment assistance programs</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

6. The 2007 Farm Bill may support new programs with new or reallocated Federal funding. Please indicate how important you feel it is to provide new or reallocated funds for the following programs. (Circle one: 1 = least important, 2 = less important, 3 = not sure, 4 = important, 5 = most important)

<b>Commodity payments tied directly to farm income (support payments tied to farm income level)</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Commodity payments for non-traditional program commodities (fruits, vegetables, nursery crops, livestock, wood products, etc.)</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Commodity payments targeted to smaller Family farms</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Farm savings accounts</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Bioenergy production incentives</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Biosecurity incentives and assistance</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Food safety programs and assistance</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Traceability programs (identity preservation, animal identification, etc.)</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Organic certification programs.....</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

7. If Federal funding for risk management programs is increased, which approaches are most preferred? Please indicate how important you feel it is to support the following alternatives. (Circle one: 1 = least important, 2 = less important, 3 = not sure, 4 = important, 5 = most important)

<b>Increase coverage, protection levels, and premium subsidies for crop production and revenue insurance (APH, RA, IP, CRC, etc.)</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Increase coverage, protection levels, and premium subsidies for whole-farm or ranch income insurance (AGR, AGR-Lite)</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Establish tax-deferred savings accounts for farmers, providing for withdrawals in low-income years or at retirement</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Provide incentive payments for using various risk management tools, including hedging, Insurance, savings accounts, and education</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

8. Considering the following environmental goals, should Federal conservation programs be modified to increase benefits for landowners in the Northeast states?

<b>Water quality protection</b>	<b>___ Yes</b>	<b>___ No</b>
<b>Soil erosion control</b>	<b>___ Yes</b>	<b>___ No</b>
<b>Air quality protection</b>	<b>___ Yes</b>	<b>___ No</b>
<b>Wildlife habitat protection</b>	<b>___ Yes</b>	<b>___ No</b>
<b>Open space protection</b>	<b>___ Yes</b>	<b>___ No</b>
<b>Management of animal wastes</b>	<b>___ Yes</b>	<b>___ No</b>
<b>Carbon sequestration</b>	<b>___ Yes</b>	<b>___ No</b>
<b>Maintenance of biodiversity</b>	<b>___ Yes</b>	<b>___ No</b>

9. What policies and programs not mentioned above do you think would help maintain or improve the economic prospects for specialty crop production in the Northeast states?

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## **Appendix B-Listening Session Notes W. I. (Myers Advisory Council)**

*N. Bills, 10-20-05*

A synopsis of comments received in Myers Council listening session  
on specialty crops and the 2007 Farm Bill

October 19, 2005, Ithaca NY

Presently, as in years past, Federal farm legislation has been tailored to the needs of a few welfare crops. It is unseemly to consider adding specialty crops to this list; specialty crop reducers do not want government welfare. Specialty crop producers are not looking for direct government assistance or handouts. Instead they prefer to be in the position of criticizing other welfare recipients.

As the 2002 farm bill was implemented, specialty crop producers learned several important lessons about the policy scene in Washington. At the outset, many specialty crop producers thought they were in "good shape" with provisions established and programs authorized. There was excitement about conservation options available to specialty crop producers, for example, along with opportunities for marketing and export assistance. But, many of these opportunities evaporated or were greatly diminished by the Congressional appropriators as time wore on.

Conservation concerns in the specialty crop community have centered on water quality. Conservation measures that afford protection for surface water bodies-- including land management in riparian zones along creek banks and streams are useful but have been hampered by too little attention from the Congressional appropriators.

Conservation set-aside programs-- the flagship being the Conservation Reserve Program-- do not interest specialty crop producers. Specialty crop growers occupy and utilize New York's best land; they are in no mood to retire this well-qualified acreage. You give marginal land to the government set-aside programs and keep the good stuff for moneymaking.

Specialty crop producers (this is a Western New York grower speaking, reflecting the ambivalence we see around farmland protection programs statewide) are not interested in purchase of development rights programs. Growers in Western New York wince when they hear about development rights sales on Long Island in \$20-\$30000 per acre range, and wonder about the propriety of such program action.

On the other hand, it is important for policy to deal with the churning we see in local land markets and the entry of individuals with limited or uncertain farm production interests (this coming from a large farm operator in the Capital District in eastern New York).

There's room for great concern with policy proposals for direct aid to specialty crop producers

based on a "me too" argument and little more. Bringing this discussion to the table wearing such cheap cloth is repugnant. Proposals to include specialty crops on the list of preferred crops for direct support has no merit (but, responding to counter questions, this respondent indicated that his squeamishness about opening the Federal treasury to specialty crop growers did not extend to indirect support such as subsidized crop insurance, conservation subsidies, and the like. It's that frontal assault on the treasury that, again, riles the righteous).

While direct support is not-- should not be-- in play as a policy option, specialty crop producers need access to a variety of creative program efforts that would center on bio-security concerns, food safety, accommodation of efforts to assure traceability of consumer group food products, and the like. We need to deal very directly with the concerns today's consumer has about produce and food products derived from specialty crop production in the Region. More Federal money is warranted here.

Indeed, as others have mentioned, it is foolish to imagine that specialty crop producers might want to start down that road of direct government support. It is "not working now so why would others want to try it?" But there are many areas that provide viable entry points for Federal policy: new improved and possibly extended risk management tools are one area that offers many possibilities, along with expanded research and development efforts and more focused programs to expand specialty crop markets and marketing opportunities.

Programs focusing on the family farm or the small farm strike a very responsive public policy cord. Politicians like to posture themselves around these matters and the public at large carries a reservoir of goodwill centered on the imagery of small farms and hard working families embedded in farm commodity production business. However, since the small farmers often carry out agriculture on a very limited scale, often garnering as little as \$10,000 in farm receipts -- they are not really involved in agriculture. Granted, they take up a lot of space.....

One graphic example of the small farm mentality was provisions in the 2002 farm bill for dairy. Direct cash payments to dairymen were capped, meaning that larger farms got less Federal support.

Despite the political tractability of small farm programming, these programs are deficient. They delay the pain that comes from continual need for structural adjustment in a dynamic industry like agriculture; they distort production and consumption decisions by propping up prices.

When will we finally pull the plug on Federal disaster assistance? Continual access to ad hoc disaster appropriations undermines the risk management and insurance programs that we all want to operate effectively and to the advantage of the taxpayer.

Programs with high political sex appeal going forward will be those focusing on biofuels and alternate energy sources.

Crop insurance, on the other hand, is a vital instrument but is not a very sexy subject. And, administering crop insurance is very hard work. When pressed for more comments and answers on risk management and insurance, the Council members generally indicated a preference for more programs focused on perils associated with revenue or farm income, rather than perils centered on

the production of any one crop. This argument extended to the quality dimension and the variety of market outlets (hence different prices) that specialty crop growers generally contend with, especially fruit and vegetables, make the insurance program less workable compared to grain and other program crops. Also, we have a large number of relatively small-acreage specialty crops, which makes it more difficult for insurance agents and adjustors to deal with loss assessment than it is for the major crops. The administrative nightmare, all considered, they think, lives here with a program centered on individual crops.

An overriding redeeming feature of insurance models centered on revenue is that perils associated with price changes are "covered".

Going forward, there are probably opportunities to work with entirely novel insurance models. Consider weather-based models for instance.

It shouldn't be all about crop insurance or insurance models in general. The idea of tax-deferred savings accounts makes a lot of sense. We hate to admit it or even talk about it, but many farmers make an awful lot of money. More experimentation with incentives to get farmers in closer association with savings accounts of various sorts has a lot policy merit. A very favorable side effect associated with programs of this sort is the opportunity to be creative with policy and impart a greater sense of entrepreneurship and management in the industry. All of this of course, one thinks, ultimately leading to better and more timely decisions on growing a business



**Appendix C-Listening Session Notes with Northeast Representatives of the  
National Association of State Departments of Agriculture**

*Nelson Bills and Jerry White*

**Summary  
Conference call with NASDA representatives  
24 October 2007**

Which, if any, new or modified provisions for specialty crops would be likely to fall in the amber, blue, or green boxes as WTO deliberations move forward? Any new initiatives must be attentive to trade concerns.

The Cornell project comes on the heels of the Specialty Crops Competitiveness Act of 2004. How do the Cornell folks see their project relating to this Act, which deserves attention but has received limited appropriations from the Congress? Listening session results in Pennsylvania with a bearing on that legislation will be made available to the Cornell project investigators.

What is a specialty crop? The 2004 Specialty Crops Competitiveness Act of 2004 defined specialty crops to include fruits and vegetables, tree nuts, dried fruits, and nursery crops (including floriculture). The Cornell project's list, is arbitrary, but includes a more expansive crops list: fruit, vegetables, floriculture, nursery, turf, maple syrup, Christmas trees, aquaculture, honey, and mushrooms.

Cornell has initiated contacts with 75 organizations across the Northeast that have interests in these aforementioned crops. Results from this outreach survey are being tabulated now and will be circulated to this conference call group, probably within the next 10 days.

Representatives from Pennsylvania and Delaware referenced listening sessions either recently concluded or soon-to-be wrapped up. We would be very interested in summaries of those discussions.

Delaware: listening sessions indicate little interest in direct subsidy for specialty crop producers that might parallel payments received by producers of program crops; in contrast, the response was very positive regarding marketing, research and development support from the USDA.

The menu of program options is extensive. The hard part is figuring out which program to choose and how to mix and match the program options. Many growers express general support for specialty crops but also clearly recognize the obstacles in the current political and fiscal environment in Washington, DC.

Vermont: we can teach farmers how to fish or we can give them fish. That is, Vermont growers also are not likely to be looking for direct financial support. However, specialty crop growers do want marketing and other support to improve the economic viability of their businesses.

It was mentioned that the most NE states had their own marketing/branding programs (for example, Pride of NY) and there needs to be a good deal more regional collaboration. These programs are competing with those from the other states... It is possible that individual Northeast states might be able to multiply their efforts by going after consumers with an integrated regional approach. Consider the Walmart example with the apple brand “Eastern Apples” with 50 grower-suppliers—an example that might be emphasized in a regional collaboration in marketing.

There was sentiment expressed for transitional help for growers going organic, with lowered incentive payments through time. Moving from traditional crop production to organics involves a huge risk and substantial sacrifices in income in the near term. Direct financial assistance might be warranted because of that three-year transitional period when you cannot get price premiums nor can you be certified organic. Direct Federal assistance could help when “the grower’s banker is not happy with his/her conversion to organic” by compensating for the higher risk and the learning curve involved in moving to organic production.

Supply chain incentives, such as help for implementing food safety and traceability programs, were endorsed. Support for “soft” approaches such as incentives for R&D and educational efforts were mainly supported rather than outright grants for equipment or buildings. Tax incentives, somewhere in the middle between the extremes of education/R&D and grants for equipment & buildings, were generally supported.

There was general support for crop insurance subsidies for revenue insurance (AGR and AGR-Lite), but also for individual crop policies. AGR-Lite appears to be an answer for some specialty crop growers; these subsidies were supported for the larger specialty crops (apples, grapes, etc.). An observation was that many insurance providers find the revenue policies too complicated to administer and to explain to producers. “Private insurance carriers are not good on delivery of whole farm policies”.

Another concern is the lengthy approval process for new insurance products from RMA. We need a way to fast track insurance options and tools.

Individual crops insurance models are attractive from an administrative standpoint. Tracking yields and exposure to risk are easier to figure out for a single commodity. Conversely, as noted above, insurance agents are really challenged with the broader whole farm insurance products, especially when a variety of specialty crops are in play.

Effective demand for these products on the part of specialty crop producers is there if we can iron out the administrative issues associated with marketing and servicing the coverage.

A DE representative mentioned that individual crop coverage was the preferred type of policy there, because of the importance of large acreage grain crops. However the cost of production for specialty crops, relatively high crop values, and the high risk assumed by growers demonstrates the need for insurance products for these crops.

VT noted resistance from small farm operators, especially in the case of specialty crop producers, to buying crop insurance. Part of the issue is clearly premium costs. If a direct marketer is small and produces many crops, he or she has to evaluate many policies in order to buy regular crop insurance, and some crops won't have any coverage. That is the theoretical advantage of AGR and AGR-Lite; many crops, one policy (that includes coverage for reduced output prices). That is also the theoretical advantage for insurance carriers, who might save time when explaining and administering one policy instead of individual crop policies for small acreages of several crops. Nevertheless, the observation that "private insurance carriers are not good on delivery of whole farm policies" remains valid. Relatively few companies have made the effort to sell and service these revenue products in the Northeast.

Increased liability limits to \$1 million dollars (a change in policy limits put into place for 2006) will increase the acceptability of AGR-Lite.

Farm savings accounts were recognized as having general appeal. A program like this can be closely attuned to market conditions and often strikes a responsive chord with growers; but the devil would, as usual, be in the details. A good deal of education might be needed to roll a program like that out. Growers of program crops might be interested in banking their counter cyclical payment and other payments in good crop years. There is a definite need for farmers to put something into savings accounts, whether for a bad year or retirement. Tax considerations and accounting practices can be a critical element in the design and administration of such accounts. Careful attention will need to be given to those matters.

On alternative energy, support for (1) research (2) tax credits for investments and (3) direct subsidy to offset costs were suggested. VT noted that the benefits seem to be accruing mostly to the largest farmers. An example offered is funding for manure management on Vermont dairy farms. Farmers need access to the information and research that is viable for small to moderate size farming operations. The next step would be direct financial assistance (note that? the context here is nutrient management on dairy farms).

Expenditure to implement biosecurity is an emerging issue. Farmers are wary of the costs they are likely going to incur as they attempt to hit biosecurity milestones; the main discussion so far has been around dairy. Who will pay the substantial costs of meeting the requirements? Can these programs be privatized and if so, who will pay? However, growers and producers recognize that these programs will be part of their business going forward. The discussion has moved from what kind of programs would be implemented to a debate about who would pay for implementation.

An emergent issue that has received too little attention so far deals with ownership of the data and intelligence that would accrue around privatizing biosecurity and traceability programs. Consider livestock: what more accurate marketing tool could be available if one knows the number of livestock, their age, their location and so on?

On the produce side there is also some movement forward with regard to traceability. Our larger producers (in New York State) are already doing something. Consider cabbage.

Consider onions. The expenses are not insurmountable but they are very noticeable. It would be helpful if Federal assistance was available to help underwrite them.

Smaller growers: depends on their marketing channel. In general, they are much more reliant upon their relationships with their consumers. Their consumers know them and they want to have direct acquaintance with the grower. Many small growers are now self-identified in markets.

Food safety also involves the states in data gathering, so that if a pattern of problems or incidents emerges, action can be taken. Pennsylvania is putting a great deal of effort into data management and systems that streamline their food safety monitoring processes. A lot of emphasis is on food manufacturing. Again, Federal assistance would be very helpful in overcoming the costs of these efforts and programs.

Bioenergy also was supported as an enterprise that needs support in the Farm Bill. Research is needed to develop the integrated processes needed to capitalize on biomass as an energy source. Cellulose based feedstocks represent a major opportunity for the Northeast. The technology needs to be teased out. Incentive payments are needed to encourage farmers and other landowners to shift to that kind of enterprise and develop the necessary marketsheds. Growers probably won't be owning the production facilities needed to provide a ready outlet for cellulose material produced on the farm, whether by planting dedicated energy crops or harvesting grass crops.

The farm bill can help bridge the gap between cellulose based energy sources and mandates for substituting for petroleum. The Northeast has many of the necessary conditions in place to make these projects go; this includes climate, ample supplies of marginal land and ready nearby markets for energy products.

Consideration ought to be given to Federal matching funds for farm savings accounts. Federal dollars on a 1:1 ratio or, even better, a two for one match on dollars would really sweeten the pot and get broader participation in the farm community. Appropriate tax treatment, especially for growers who do business on a cash and often prepay basis, would also spur interest in the farm community.

Traceability: would be supported if it has a specific market advantage. A value added advantage? But part of this is market access. Our competitors are capable of tracing apples back to the row, if not the tree. Consider Chile. So we may be going there whether we want to go or to preserve our place at the marketing table. Federal assistance through grants and other financial incentives would be welcome. Actual cost exposure depends on the industry involved.

**Appendix D: Summary of main points made by panelists at the 26 October New York Crop Insurance Workshop in Syracuse, NY.**

*Compiled by Jerry White*

Organization of the panel was as follows:

AGR/AGR-Lite: An On-the-Ground Assessment

Roundtable Moderator *Jerry White, Cornell University-Professor (Leader of the Department of Applied Economics and Management's Crop Insurance Education Program)*

*Rick Chandler, Massachusetts Department of Agricultural Resources (farm business planning and land use specialist and a co-operator with the MA Crop Insurance Education Program)*

*Alison De Marree, Cornell Cooperative Extension (Area Extension Educator with the Lake Ontario Fruit Team and a cooperator on Cornell's Crop Insurance Education Program)*

*Jeremy Forreth, Northeast Senior Marketing Agent, Crop Growers Insurance Services*

*Charles Koines, Crop Insurance Consultant*

- 1) Each panelist presented a success story from the field where having AGR/AGR-Lite made a real difference to a farm.**

**Chandler**

All of us know of a few situations where people had crop insurance at the right moment in time. For AGR, this occurred in my area when the bottom fell out of cranberries, when blue mold came in and damaged tobacco, and basically anytime that the income drop is sufficient to trigger a large payment regardless of the buy up levels. However, I prefer the story of a farmer who has had both APH and AGR insurance every year for a number of years. He is content when, within a 5 year period, he covers enough claims that the return from crop insurance pays the premiums for that same 5 years. In other words, he has "free" protection against the big problem by buying enough coverage to collect small amounts on the lesser failures over the years. No miracles—just smart and conservative thinking.

**Koines**

The success story I used was the case study that was included in the workshop binder. The 5 year base period had income increases of 250% and decreases of 60% from one year to

another. The farm did not qualify for indexing. The intended income was 42% of the approved income. Despite these conditions, the farm suffered a financial loss during the insured year and was able to receive a loss payment.

### **Forrett**

A producer with a 600 acre diversified vegetable operation attended meetings regarding AGR. He decided that he could mitigate his risks of weather and market fluctuation through insurance with AGR. The first year that he chose the coverage we experienced an extremely wet spring. This delayed his planting schedule and pushed him out his marketing season, in which he usually marketed early and captured the higher market prices by doing so.

By the time his crop matured, he was competing in a depressed market. Canada did not have the delayed start that NY had and were hitting the market in high volume with produce. This loss of market reduced this revenue by 30% and was enough to trigger a loss payment. This producer understood his risk exposure, looked at the weather and market trends of the last 10 years and determined that the revenue based program fit his needs much better than a production based program.

- 2) Each panelist presented their ideas about how best to target producers for sales of policies or educational programs. To which farm types/commodity groups should we direct our efforts in order to increase participation?**

### **Chandler**

Clearly we need to target small to medium diversified farms, especially those with a livestock (in its broadest definition) component. That said, we need to show the product works and addresses the changing needs of such farms. We hear that other crop insurance products work pretty well for traditional farms, but it is truly the underserved that need AGR. By creating one simple and flexible AGR product (combining the best aspects of AGR and AGR-Lite), we should be able to sell a lot of it. Right now, it costs too much and it is too confusing a product to promote to the types of folks who might best buy it. Fix that, and the target group will flock to the door.

### **Koines**

We should focus on producers of multiple crops are not using crop insurance and producers of crops that receive higher than average prices. This would include producers of organic crops, specialty crops, and direct marketers.

### **Forrett**

Looking at the AGR-Lite changes that the FCIC Board approved this summer:

- Increased liability to \$1 million

-Moved the sales closing to March 15 (details provided shortly)

These changes open up (expand) the target audience. In addition,

- The 2004 fall marketing season for our direct market/retail/U-pick operations was one of the best in recent years. However, the 2005 fall marketing season for our direct market/retail/u-pick operations was one of the worst in recent years. One insured direct marketer shared his budget numbers for the Columbus Day weekend with me. He planned for \$90,000 in sales, ordered inputs for this amount of projected sales, and after the weekend wrapped up, actual sales were \$12,000. The last two weekends in October were no better.

The need is there and the loss of revenue is real. We should send postcards to the direct market/retail/u-pick operations reminding them that this type of coverage (AGR/AGR-Lite) protection is available. The iron is hot!

### **DeMarree**

For our educational programs, we need to incorporate crop insurance information at general educational meetings held throughout the year, such as the Fruit and Vegetable Expo. Growers need constant reminders, and it is getting harder to get them out for meetings just about crop insurance.

In terms of target audiences, fruit and vegetable growers both fresh and processing remain the main target audiences.

### **3) Each panelist suggested barriers to participation. Why aren't more AGR/AGR-Lite policies being sold?**

### **Chandler**

The cost of AGR needs to be subsidized more. Follow through on the early commitment to transfer disaster payment funds to AGR (and other crop insurance) subsidies.

The reputation of crop insurance is not helped by stories of denied claims, technical disqualifiers, too broad promises, etc. Have something clear to sell. Be absolutely certain to list exactly what is covered. Don't emphasize the exceptions, say what is covered. Give examples of both successful and denied claims and explain why. This product is too confusing as it now stands, and leaves too much to the discretion and interpretation of agents and adjusters.

Make the deadline dates workable for farming realities.

Really cover animals; address quarantine and damage without mortality. These are common causes of loss of income. Do not pass the buck to unknown programs you think might cover this if AGR doesn't. AGR is a REVENUE policy. If your revenue is down through no fault of your own, you should be covered. PERIOD.

Address the inequity in not counting crop insurance payments as income against averages.

Find a way to include farmers with less than 5-6 years of tax records/experience, both qualified new farmers and older farmers making significant changes in their operations.

### **Koines**

We need to provide coverage for new producers who have not been in business for 5+ years.

### **Forrett**

The main barrier is that not enough agents understand the program. The AGR/AGR-Lite program is tax form based and most agents do not have enough experience working with this program. We need to put emphasis in educating the agents on the ins and outs of the program. Educating agents should be completed jointly with RMA and the insurance companies.

### **DeMarree**

Low profitability (or no profitability) is the main barrier. This year for fruit, the crop is down for many growers and the price for processing fruit is also down (due to small fruit size). There is no money to pay crop insurance premiums after paying for increased labor costs and higher energy bills (fuel for machinery and getting in the crop, heating bills for labor camps, delivery costs for getting the crop to the packing house or to market, etc). Growers are under a lot of pressure to try to reduce expenditures, and crop insurance premiums are one expense that gets singled out when there is not enough revenue to cover costs.

- 4) Each panelist presented one program change that they would most like to see implemented with AGR/AGR-Lite to make the policy more attractive to producers.**

### **Chandler**

Simplify the policy and the adjustment practices.

Make farmers with less than 5-6 but more than two years experience eligible.



Stop responding to all criticisms and suggestions by saying “Kansas City doesn’t like it, so we give up”.

Make justified and well considered changes within ONE YEAR of realizing they would make a difference.

Have one well done AGR policy and make it affordable without too many qualifying levels. (Refers to the existence of both AGR and AGR-Lite, with differences such as sales closing dates and maximum policy liabilities, and other minor differences).

### **Koines**

We need to include income from crop insurance payments in the base period for calculation of the AGR.

### **Forrett**

Multi-Peril Crop Insurance proceeds either need to be counted as allowable revenue in the history and at loss time, or not counted in the history and at loss time. How these proceeds are handled when working with the program determines whether or not producers continue the coverage after experiencing a loss which results in an indemnity.

### **DeMarree**

Have larger subsidies. Also, treat crop insurance payments in the revenue history the same as they are treated for revenue to count at the time of a claim.

Also, the purchase of MPC I (for AGR, not AGR-Lite) has to be taken in situations where a crop is produced that accounts for over 50% of a producer’s total revenue. (This is the case for many fruit growers for which apple receipts account for a major part of their incomes.) Since the decision about which policies to take is interdependent, the closing date for perennials is too early; growers haven’t had enough time after harvest to give serious consideration to which policy or policies to take, and at what coverage levels. A sales closing date of 20 December for perennial crops and 15 March for AGR would allow growers more time to analyze their crop insurance needs and make a better decision about policies and coverage level to take.

## Appendix E-Listening Session Notes

*Compiled by Jerry White and Nelson Bills, 12-5-05*

### **NOTES from Listening session with New York Farm Bureau, 17 Nov. 05**

Present:

Bob Hokanson  
John Tauzel  
George Lamont  
Jerry White  
Nelson Bills  
Brent Gloy  
Wen-Fei Uva

- There are concerns with the idea that government funds should be used for direct support to specialty crop producers. One key consideration in the current policy environment is the WTO and concern about price distorting Federal support policies; direct support for specialty crop producers may be an amber box problem going forward. They liked the idea of subsidized crop insurance and higher coverage levels for specialty crop growers.
- The Competitiveness Act for Specialty Crops should be funded. This legislation has provisions that the specialty crop growers need. Last thing in the conference call, George Lamont made a strong case for more research dollars for specialty crops. These research dollars could flow in quantity under this legislation.
- Conservation Security Program (CSP) is favored. This program can easily be tailored to the needs of specialty crop producers; consider provisions for integrated pest management and supplying funds needed for pesticide management facilities. However, exacting USDA construction standards can confound the process. For example, construction of a pesticide loading station that proceeds under USDA standards for dispensing EQIP cost-share dollars can cost MORE dollars out of the producer's pocket compared to doing the project without government cost-sharing funds.
- Also need regulations that can be useable and available to fruit and vegetable growers—an example is the administrative features of the CSP. Some Erie Co. vegetable growers couldn't participate in the CSP because of inappropriate standards established by the USDA on soil loss tolerances and application of a soil conditioning index. These programs need to reward good stewardship. Need to get specialty crop growers to the table, rather than see them out-muscled by dairy. It was noted that specialty crop growers have better access to Federal conservation dollars in WI and MI compared to NY.
- The CSP has the program direction needed. It is a program designed to reward and enhance conservation stewardship on farms where managers are committed to proper conservation management... too often, government dollars go to cleaning up somebody else's lax conservation behavior.

- Disaster Assistance still has a role. Will never get perfect crop insurance programs, so we need disaster assistance to fill in the gaps. But even with disaster assistance, growers in counties where there is not a concentration of farms for a commodity (e.g. apples in Broome Co.) may get left out.
- As a part of disaster assistance, low interest loans are not favored. When confronted with crops losses, growers are often not well positioned to take on additional loan liabilities.
- Unfortunately, politics can play a role in disaster assistance as well. Sometimes political considerations work to the advantage of specialty crop producers and sometimes they do not. But ideally, disaster assistance would have little or nothing to do with which Congressional District a specialty crop farmer is located in.
- Market Assistance Promotion (MAP) was left out of our list of programs. This program has considerable merit for specialty crops and specialty crop growers and should be included in 2007 farm bill deliberations...
- Re Farmland Protection, writing effective easements is a challenge. The USDA has a tendency to over regulate here and states are often confronted with difficulties in matching states dollars to Federal dollars for farmland protection. A preferred policy direction with Federal money is block grants to the states, with latitude given to state program administrators on scope and direction of easement administration.
- Another problem with farmland protection regulations at the Federal level are restrictions on amount of impervious surface on affected parcels; this restriction can negatively impact effective easement development for specialty crop producers. Consider greenhouses and facilities for farm markets. This has been a big issue for areas where greenhouses are numerous--Suffolk County is the best NY example--impervious surface restrictions hamper or don't allow access to the Federal program dollars. Opportunities to leverage local dollars for easements are being missed in this case.
- The Farm Bureau works to promote programs that do not, by design, differentiate growers and producers based on farm size. Therefore, commodity payments targeted to certain farmers, whether large or small, are out of step with NYS Farm Bureau policy. No support for 1<sup>st</sup> and 2<sup>nd</sup> bullets under Q 3, (direct commodity payments) either.
- Tax deferred farm savings accounts got a lot of support. Just having tax deferment makes it interesting. Matching Federal dollars would be the icing on the cake! (When pressed to express preference for one over the other, George seemed to prefer tax deferment. Other idea: in a break-even year, the government could kick in some dollars.
- RE: Bioenergy. Incentives for using bio-diesel fuels make sense. However, production of biodiesel feedstocks in New York State offers limited opportunity for specialty crop growers. They do not grow these crops-- this would largely be a question of growing oil crops such as soybeans. Incentives for greater energy efficiency in greenhouses would be of considerable interest to that industry as well.
- Maybe other dedicated energy crops could be a possibility. For example, willow production might favor nursery enterprises in NY.
- Bio-security issues to apply to some specialty crop growers, although at present, the main concern is in the livestock sectors. Some floriculture producers have needed to destroy stock without indemnification. Going forward, growers will want to see more emphasis on indemnification as security issues develop.

- The same applies in the realm of food safety. Growers would like to see financial assistance for meeting more exacting food safety standards
- Growers would like to see incentive payments for participation in food safety audits required by supermarket chains. One confounding factor at present is that individual supermarket chains want to apply their own standards. This lack of uniformity in standards is very costly and time-consuming for growers who are targeting this market channel. Growers would like to see Federal intervention to encourage supermarkets to decide on and apply a uniform food safety protocol.
- Support for dollars for compliance really applies up and down the line: for biosecurity, food safety, and traceability. Specialty crop producers often have a large financial stake in each of these policy considerations and warrant the public support needed to ensure compliance.
- Organic certification needs to be included as well. Growers are incurring costs as they convert to organics and financial support would be useful.
- An emergent concern is definitions of organic. As larger producers begin entering this market (we are seeing this with fluid milk production at present), there's agitation to blur distinctions between organic and non-organic production practices. Organic production is more costly but realizes a price premium for product. So, there is a natural tendency to try to cut corners on production methods while retaining the organic designation. This means that certification must be closely monitored.
- RE: Q 4, Specialty crops growers realize that traditional crop insurance policies do not work well for them, and they would like to see increased subsidies. Higher coverage levels need to be subsidized more relative to lower coverage levels, which get a higher percentage of subsidy at present. See Fm. Bur. wish list for RM/CI. (We have been supplied with the New York State Farm Bureau materials to accurately determine their policy position).
- On AGR, would like to see same income items used to calculate five yr. adjusted gross revenue history—as is used in revenue to count when calculating a claim loss.
- Need a Specialty Crops title for the 2007 farm bill. Furthermore, the Congress needs to not only authorize programs. The legislation also needs to be funded!

# OTHER A.E.M. RESEARCH BULLETINS

RB No	Title	Fee (if applicable)	Author(s)
2006-03	Farm Savings Accounts for Specialty Crop Growers		Cheng, M. and B. Gloy
2006-02	Ecosystem Values and Surface Water Protection: Basic Research on the Contingent Valuation Method		Messer, K., Platt, L., Poe, G., Rondeau, D., Schulze, W. and C. Vossler
2006-01	An Economic Analysis of Generic Fluid Milk Advertising in Ontario, Quebec, and the Maritime Provinces		Kaiser, H., Cranfield, J. and M. Doyon
2005-03	Dairy Farm Management Business Summary, New York State, 2004	(\$20.00)	Knoblauch, W., Putnam, L. and J. Karszes
2005-02	Survey of Hispanic Workers in New York State	(\$12.00)	Maloney, T. and D. Grusenmeyer
2005-01	The Profitability of Agricultural Lending Relationships		LaDue, E., Gloy, B. and C. Cuykendall
2004-13	Dairy Farm Management Business Summary, New York State, 2003	(\$20.00)	Knoblauch, W., Putnam, L. and J. Karszes
2004-12	Optimal Institutional Mechanisms for Funding Generic Advertising: An Experimental Analysis		Messer, K., Schmit, T. and H. Kaiser
2004-11	Impact of Generic Milk Advertising on New York State Markets, 1986-2003		Kaiser, H., Wang, Y. and T. Schmit
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